NOTICE OF LOCAL PLANNING PANEL MEETING

PUBLIC AGENDA

A Local Planning Panel meeting will be held in PHIVE 2 Civic Place, Parramatta at 5 Parramatta Square on Tuesday, 21 May 2024 at 3.30pm.

Gail Connolly PSM
CHIEF EXECUTIVE OFFICER

CITY OF PARRAMATTA

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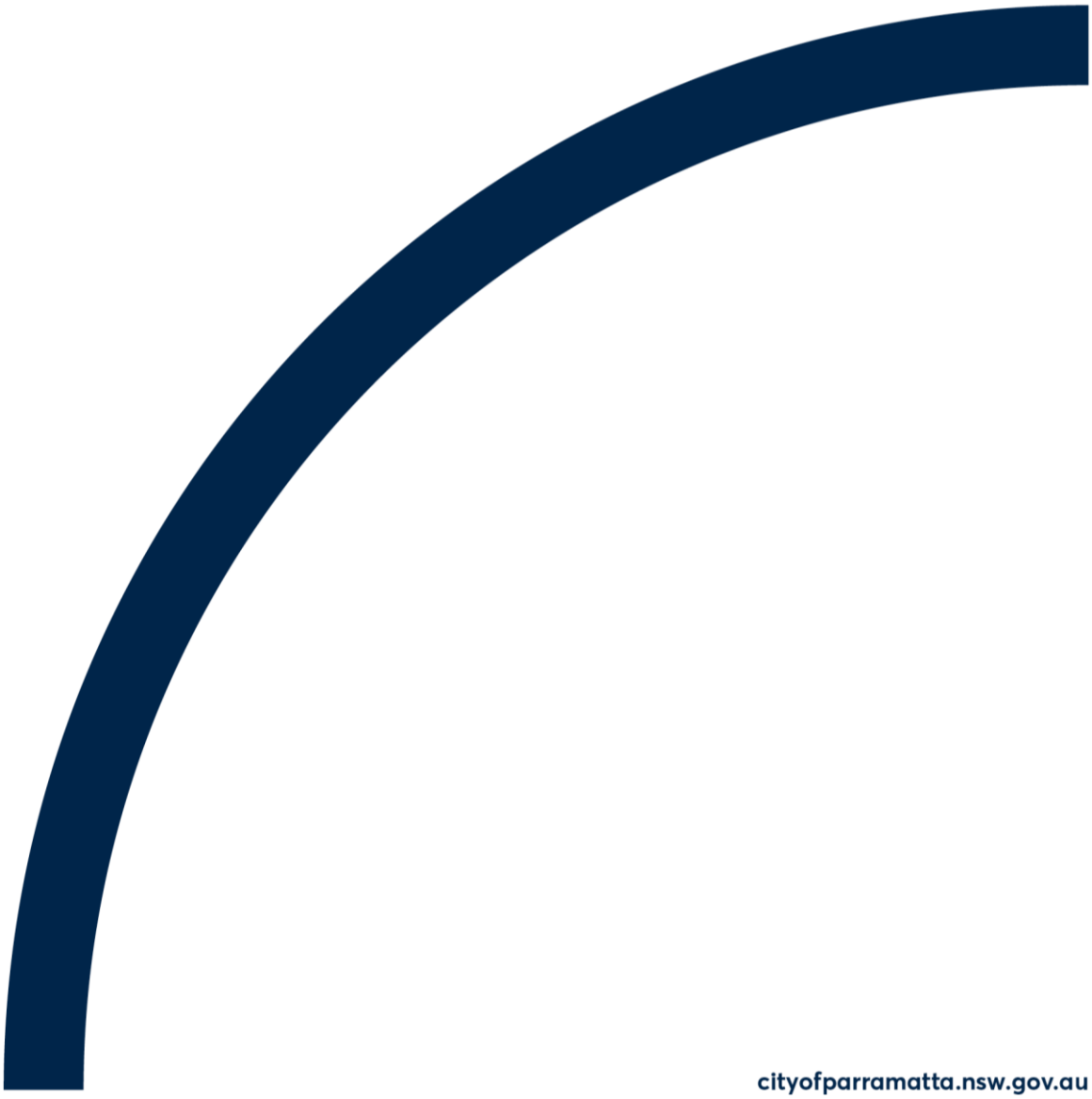

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1 ACKNOWLEDGMENT OF THE TRADITIONAL OWNERS OF LAND

The City of Parramatta Council acknowledges the Burramattagal people of The Darug Nation as the traditional owners of land in Parramatta and pays its respects to their ancient culture and to their elders, past, present and emerging.

2 WEBCASTING ANNOUNCEMENT

This public meeting will be recorded. The recording will be archived and available on Council's website.

All care is taken to maintain your privacy; however if you are in attendance in the public gallery, you should be aware that your presence may be recorded.

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DEVELOPMENT APPLICATIONS

21 MAY 2024

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DEVELOPMENT APPLICATION

ITEM NUMBER	5.1
SUBJECT	OUTSIDE PUBLIC MEETING: 150-152 Briens Road, NORTHMEAD NSW 2152 (Lot 111 in DP 1160038)
DESCRIPTION	Construction and use of multi-unit industrial warehouse and ancillary offices, storage premises, carparking & signage. The application is Nominated Integrated Development under the Water Management Act 2000.
REFERENCE	DA/19/2023 - D09413254
APPLICANT/S	Hannas Contracting Services Pty LTD
OWNERS	Briens River Pty Ltd
REPORT OF	Group Manager Development and Traffic Services
RECOMMENDED	Approval (via Deferred Commencement)

DATE OF REPORT 22 APRIL 2024

REASON FOR REFERRAL TO LPP

Development Application 19/2023 was originally reviewed by PLPP on 21 November 2023 but its determination was deferred for additional information. The application has since addressed the deferral matters and is before the PLPP for determination.

The application was initially referred to the PLPP as the proposed construction of the industrial warehouse seeks approval to breach the maximum height by more than 10%.

EXECUTIVE SUMMARY

This is a summary of the full assessment of the application as outlined in Attachment 1, the Addendum Assessment Report.

Development Application 19/2023 which proposed the construction and use of the multi-unit industrial warehouse and ancillary offices, storage premises, carparking and signage was reviewed by the Parramatta Local Planning Panel (PLPP) on 21 November 2023. Upon review of the application, the PLPP deferred its decision on the application for the following reasons:

1. *In relation to the proposed drainage easement which is a fundamental requirement of approval, the Panel is not satisfied, on the information available, that there is legal power to grant this easement over the Council land.*

2. *In relation to the remaining proposed deferred commencement Conditions, the Panel is not satisfied with these matters as subject to deferred commencement Conditions where is no certainty with the outcome at the point of granting consent. The Panel needs to be satisfied following the provisions of these reports etc that the proposal is satisfactory in terms of storm water, drainage, flooding, public domain matters and landscape outcomes. This information should be provided prior to determination of the development application so the impacts can be appropriately considered.*

This addendum report provides a response to the abovementioned reasons for deferral. Upon review of the response, Council recommends that the Panel:

- Approve the application via deferred commencement, subject to conditions of consent.

It is noted that the applicant was given the opportunity to review the amended conditions of consent and raises no objections to the conditions as attached to the addendum report.

RECOMMENDATION

(a) That the Parramatta Local Planning Panel, exercising the function of the consent authority, grant **deferred commencement development consent** to DA/19/2023 for the construction and use of multi-unit industrial warehouse and ancillary offices, storage premises, carparking and signage for the following reasons:

a. The development is permissible in the IN1 General Industrial zone pursuant to the Parramatta Local Environmental Plan 2011 and satisfies the requirements of all applicable planning standards controls.
b. The development will protect the natural environment.
c. The development will not adversely impact on the visual character of the area.
d. For the reasons given above, approval of the application is in the public interest.

(b) That the Parramatta Local Planning Panel, approve the Clause 4.6 variation to the Height for the following reasons:

a. The departure representing a variation of 21.5% from the standard is reasonable and allows for a transition of height that is sympathetic with the existing topography whilst providing good urban design and an appropriate building platform.
b. The departure does not result in adverse amenity impacts to adjoining developments and to the reserve.
c. Despite the departure the development remains generally consistent with the controls and provisions of DCP 2011.
d. The variation to the height does not result in unreasonable perception of bulk and scale.

(c) That the Parramatta Local Planning Panel, approve the Clause 4.6 variation to the FSR for the following reasons:

a. The variation is a 2.5% departure to the standard and is minor in this instance and is a result of floor area located within the basement which does not unreasonably result in a bulky development.
b. The development remains generally compliant with building setbacks, articulation, landscaping and good urban design so that any exceedance in FSR is negligible on the streetscape and neighbouring developments.

c. The minor departure to the FSR does not result in unreasonable vehicular or pedestrian traffic that would otherwise be expected for similar developments within this location.

d. The minor variation to the FSR does not result in unreasonable overshadowing of adjoining development or to the reserve, loss of amenity to neighbouring developments or loss of views.

Denise Fernandez
Senior Development Assessment Officer

ATTACHMENTS:

1	Attachment 1: Assessment Report & Conditions	51 Pages
2	Attachment 2: Original Assessment Report	72 Pages
3	Attachment 3: Owner's Consent (confidential)	2 Pages
4	Attachment 4: Locality Map	1 Page
5	Attachment 5: Architectural Plans	40 Pages

City of Parramatta	
File No:	DA/19/2023

SECTION 4.15 ASSESSMENT REPORT – ADDENDUM REPORT
Environmental Planning & Assessment Act 1979

DA No:	DA/19/2023
Subject Property:	Lot 111 DP 1160038 150-152 Briens Road, NORTHMEAD NSW 2152
Proposal:	Construction and use of multi-unit industrial warehouse and ancillary offices, storage premises, carparking and signage. The application is Nominated Integrated Development under the Water Management Act 2000.
Date of receipt:	13 January 2022
Applicant:	Hannas Contracting Services Pty Ltd
Owner:	Briens River Pty Ltd
Property owned by a Council employee or Councillor:	The site is not known to be owned by a Council employee or Councillor
Political donations/gifts disclosed:	None disclosed on the application form
Submissions received:	None
Recommendation:	**Deferred Commencement approval subject to conditions**
Assessment Officer:	Denise Fernandez

Legislative Requirements

Relevant provisions considered under section 4.15(1)(a) of the Environmental Planning and Assessment Act 1979	• Water Management Act 2000 • Biodiversity Conservation Act 2016 • Protection of the Environment Operations Act 1997 • State Environmental Planning Policy (Resilience and Hazards) 2021 • State Environmental Planning Policy (Transport and Infrastructure) 2021 • State Environmental Planning Policy (Biodiversity and Conservation) 2021 • State Environmental Planning Policy (Industry and Employment) 2021 • Parramatta Local Environmental Plan 2011 • Parramatta Development Control Plan 2011
Zoning	IN1 General Industrial and SP2 Special Infrastructure
Bushfire Prone Land	No
Heritage	No
Heritage Conservation Area	No
Designated Development	No
Integrated Development	Yes – Pursuant to the Water Management Act 2000
Clause 4.6 variation	Yes – Application seeks a variation Clause 4.3 – Height and Clause 4.4 – FSR of PLEP 2011
Delegation	**Parramatta Local Planning Panel (application seeks variation to a development standard > 10%).**

1. Executive Summary

Development Application 19/2023 which proposed the construction and use of the multi-unit industrial warehouse and ancillary offices, storage premises, carparking and signage was reviewed by the Parramatta Local Planning Panel (PLPP) on 21 November 2023. Upon review of the application, the PLPP deferred its decision on the application for the following reasons:

1. *In relation to the proposed drainage easement, which is a fundamental requirement of approval, the Panel is not satisfied, on the information available, that there is legal power to grant this easement over the Council land.*

2. *In relation to the remaining proposed deferred commencement Conditions, the Panel is not satisfied with these matters as subject to deferred commencement Conditions where there is no certainty with the outcome at the point of granting consent. The Panel needs to be satisfied following the provisions of these reports etc that the proposal is satisfactory in terms of storm water, drainage, flooding, public domain matters and landscape outcomes. This information should be provided prior to determination of the development application so the impacts can be appropriately considered.*

This addendum report provides a response to the abovementioned reasons for deferral. Upon review of the response, Council recommends that the Panel:

- Approve the application via deferred commencement, subject to conditions of consent.

2. Response to Deferral Reasons

In response to the reasons for deferral at the PLPP meeting of 21 November 2023, Council provides the following:

1. Council sought legal advice on the matter of the proposed drainage easement over Council land per the deferral reason.

   Firstly, it is noted that Council's Plan of Management of Community and Crown Land, Appendix D, classifies the land the subject of the easement as community land.

   A court decision in *Aussie Skips Recycling Propriety Ltd v Strathfield Municipal Council (2020) NSWCA 29* states that neither Council nor a LPP have the power to grant easements through Community Land. However, pursuant to s 46(1)(a1) of the LG Act, Council / LPP may be empowered in certain circumstances. The clause states:

   (1) A lease, licence or other estate in respect of community land—
   (a) may be granted for the provision of public utilities and works associated with or ancillary to public utilities, or
   (a1) may be granted for the purpose of providing pipes, conduits or other connections under the surface of the ground for the connection of premises adjoining the community land to a facility of the council or other public utility provider…

   The legal advice stated that that an easement that would be considered "facility of the council" should be connected through community land to a Council facility and is underground.

   Secondly, the legal advice also considered the requirement of obtaining owners consent (of the burdened land) prior to the determination of the application. The legal advice given with regards to this issue notes that where Council land forms part of the development (via the easement proposed), that Council's Property Assets, Services and Securities team **cannot** grant 'in principle' agreements for an easement, even if the team considers that the easement should be imposed via a Deferred Commencement and that the application still requires owners consent from Council prior to the determination of the application.

   Given the above legal advice, obtaining Council's owners consent where works such as easements through Council owned land are proposed, has since been delegated to Council's Executive Director Finance and Information. The proposed easement through Council owned land subject of this application was reviewed by Council's Executive Director Finance and Information. Upon review, they raised no objections to the proposed

easement through Council's land and issued their consent. A copy of Council's consent to lodge the application as an owner of land involved to this application via Council's Executive Director Finance and Information is located in Attachment A of this report.

2. Since the PLPP meeting of 21 November 2023, additional information has been submitted by the applicant to address the matters that were contained within the recommended Deferred Commencement. The additional information was then referred to Council's internal experts for engineering, landscaping and urban design.

   Upon review of the information, Council's engineer, landscape officer, urban designer, catchment engineer, biodiversity officer and natural open space planner raised no further objections, subject to conditions of consent.

Given the above, the only item to be addressed within the Deferred Commencement is the registration of the easement with the NSW Land Registry Services.

Deferred Commencement Condition November 2023	Condition Number
1. Registration of Easement	Remains a Deferred Commencement Condition. See Schedule 1, Condition No. 1
2. Headwall Condition	Additional information submitted. See Condition No. 10
3. OSD Condition	Additional information submitted. See Condition No. 39
4. Flood Management Condition	Additional information submitted. See Conditions No. 37-38
5. Public Domain Condition	Additional information submitted. See Condition No. 55
6. Landscape Condition	Additional information submitted. See Condition No. 57

Further, an amended conditions list is contained in Attachment B of this report.

It is considered that the reasons for deferral of the application as recommended by PLPP at the 21 November 2023 meeting have been addressed and can be determined with the information provided.

3. Conclusion

The application has been assessed relative to section 4.15 of the Environmental Planning and Assessment Act 1979, taking into consideration all relevant state and local planning controls.

Having regard to the assessment of the proposal from a merit perspective, Council officers are satisfied that the development has been appropriately designed and will provide acceptable levels of amenity for future users. It is considered that the proposal sufficiently minimises adverse impacts on the amenity of neighbouring properties. Hence the development, is consistent with the intentions of the relevant planning controls and represents a form of development contemplated by the relevant statutory and non-statutory controls applying to the land. The proposal has demonstrated a satisfactory response to the objectives and controls of the applicable planning framework.

For these reasons, it is considered that the proposal **is** satisfactory having regard to the matters of consideration under Section 4.15 of the Environmental Planning and Assessment Act, 1979 and is recommended for a deferred commencement approval subject to conditions of consent.

4. Recommendation

Pursuant to Section 4.16 of the Environmental Planning and Assessment Act, 1979:

A. **That** the Parramatta Local Planning Panel, exercising the function of the consent authority, grant **deferred commencement development consent** to DA/19/2023 for the construction and use of multi-unit industrial warehouse and ancillary offices, storage premises, carparking and signage for the following reasons:

   a. The development is permissible in the IN1 General Industrial zone pursuant to the Parramatta Local Environmental Plan 2011 and satisfies the requirements of all applicable planning standards controls.
   b. The development will protect the natural environment.
   c. The development will not adversely impact on the visual character of the area.
   d. For the reasons given above, approval of the application is in the public interest.

B. **That** the Parramatta Local Planning Panel, approve the Clause 4.6 variation to the Height for the following reasons:

a. The departure representing a variation of 21.5% from the standard is reasonable and allows for a transition of height that is sympathetic with the existing topography whilst providing good urban design and an appropriate building platform.
b. The departure does not result in adverse amenity impacts to adjoining developments and to the reserve.
c. Despite the departure the development remains generally consistent with the controls and provisions of DCP 2011.
d. The variation to the height does not result in unreasonable perception of bulk and scale.

C. **That** the Parramatta Local Planning Panel, approve the Clause 4.6 variation to the FSR for the following reasons:

a. The variation is a 2.5% departure to the standard and is minor in this instance and is a result of floor area located within the basement which does not unreasonably result in a bulky development.
b. The development remains generally compliant with building setbacks, articulation, landscaping and good urban design so that any exceedance in FSR is negligible on the streetscape and neighbouring developments.
c. The minor departure to the FSR does not result in unreasonable vehicular or pedestrian traffic that would otherwise be expected for similar developments within this location.
d. The minor variation to the FSR does not result in unreasonable overshadowing of adjoining development or to the reserve, loss of amenity to neighbouring developments or loss of views.

ATTACHMENT B – AMENDED LIST OF CONDITIONS

DRAFT CONDITIONS OF CONSENT

Development Consent No.: **DA/19/2023**
Property Address: **Lot 111 DP 1160038**
150-152 Briens Road, NORTHMEAD NSW 2152

SCHEDULE 1 – Deferred Commencement

1. Pursuant to the provisions of Section 80(3) of the Environmental Planning and Assessment Act, 1979, the development application be granted a Deferred Commencement Consent subject to the completion of the following:

   Submission to Council of suitable documentary evidence issued by the Department of Lands confirming the creation of an easement to drain water 2.0 metres wide over a downstream property or properties benefiting the subject lot known as Lot 111 DP1160038 and burdening the downstream property known as Lot 1 DP1081289 has been registered with the NSW Land Registry Services.

   Advisory Note: Easements through Council properties (or Crown land managed by Council) can take up to 12 months to finalise.

The above requirement(s) must be satisfied within 24 months of this determination or the consent will lapse.

Upon compliance with the above requirements, a full Consent will be issued subject to the following conditions:

SCHEDULE 2

PART A - GENERAL CONDITIONS

1. Development must be carried out in accordance with the following approved plans and supporting documentation (stamped by Council), except where the conditions of this consent expressively require otherwise:

   Architectural Drawings: 12679 by NettleonTribe

Drawing/Plan No.	Issue	Plan Title	Dated
DA101	D	Site Plan	3 August 2023
DA102	B	Demolition Plan	12 April 2023
DA111	G	Basement Floor Plan	4 August 2023
DA112	K	Ground Floor Plan	4 August 2023
DA113	D	Ground Floor Mezzanine Plan	28 July 2023
DA114	D	Level 1 Floor Plan	28 July 2023
DA115	D	Level 1 Mezzanine Plan	28 July 2023
DA116	C	Roof Plan	21 July 2023
DA201	D	Building Elevations Sheet 1	28 July 2023

Drawing/Plan No.	Issue	Plan Title	Dated
DA202	D	Building Elevations Sheet 2	28 July 2023
DA301	C	Building Sections	21 July 2023
DA911	C	Signage Plan	21 July 2023
DA921	A	Signage Details	13 December 2022
22Q77_DA_BE01	01	Bulk Earthworks Plan by Henry and Hymas	8 August 2023
22Q77_DA_BE02	01	Bulk Earthworks Sections by Henry and Hymas	8 August 2023
22Q77_DA_C110	01	Road Reserve Works Plan and Typical Sections.	8 August 2023
22Q77_DA_C130 - 22Q77_DA_C132	01	Briens Road Cross Sections Pages 1 – 3.	8 August 2023
22Q77_DA_C150	01	Kerb Setout Plan and Longitudinal Section	8 August 2023
22Q77_DA_C600	01	Public Domain Works	8 August 2023
22Q77_DA_C650, 22Q77_DA_C651, 22Q77_DA_C652, 22Q77_DA_C653	01	Turning Path and Driveway Sections. Pages 1, 2, 3 and 4.	8 August 2023
22Q77_DA_C700	01	Sight Distance Plan	8 August 2023

Landscape Drawings: SS22 – 5068 by Site Image

Drawing/Plan No.	Issue	Plan Title	Dated
000	H	Landscape Coversheet	4 August 2023
101	G	Landscape Plan – Ground Floor	4 August 2023
102	D	Landscape Plan Level 1	28 August 2023
501	D	Landscape Details	28 August 2023
502	D	Landscape Plant Schedule	4 August 2023
701	F	Tree Canopy Plans	4 August 2023
702	E	Existing Tree Plan	4 August 2023
PD_000	B	Landscape Coversheet	4 August 2023
PD_001	B	Landscape Public Domain Plan	4 August 2023
PD_501	A	Landscape Details	31 July 2023
PD_502	A	Landscape Plant Schedule Public Domain	31 July 2023

Stormwater Drawings:

Drawing/Plan No.	Issue	Plan Title	Dated
22Q77_DA_C101	08	Detail Plan – Ground Floor	17 January 2024
22Q77_DA_C140	01	Existing Channel Plan	17 January 2024

22Q77_DA_C141	01	Existing Channel Longitudinal Section	17 January 2024
22Q77_DA_C201	07	OSD Plan, Sections and Details	17 January 2024
22Q77_DA_C202	07	Stormwater Details and Sections	17 January 2024
22Q77_DA_C100	08	Detail Plan – Basement Floor	10 October 2023
22Q77_DA_C203	03	Stormwater outlet Details	17 January 2024

Specialist Reports

Document	Ref No.	Issue	Prepared By	Dated
Operational Waste Management Plan	4535	D	Elephants Foot Consulting	14 December 2022
Construction and Demolition Waste Management Plan	N/A	C	Elephants Foot Consulting	5 December 2022
BCA Report	116859	R01	Jensen Hughes	13 December 2022
Access Assessment Report	116859	R01	Jensen Hughes	13 December 2022
Acoustic Report	20221249.2/0812A/R1/BJ	1	Acoustic Logic	8 December 2022
Construction Noise and Vibration Management	20221249.1/2410A/R0/BJ	0	Acoustic Logic	24 October 2022
Geotechnical Report	E24701.G03_Rev2	2	EI Australia	9 December 2022
Additional Site Investigation	E24701.E03_Rev1	1	EI Australia	25 November 2022
Section J Report	116859-NCC19 Section J / JV3-r1/r2	2	Jensen Hughes	19 February 2023
Groundwater Monitoring Report	E24701.G11.01	N/A	EI Australia	28 September 2023
TfNSW Response	19.251r04v03	N/A	Traffix	18 August 2023
Traffic Impact Assessment	19.251r03v11	N/A	Traffix	April 2023

DRAFT

Flood Impact Assessment	N/A	A	J.Wyndham Prince	31 July 2023
Ecological Assessment Report	21HANG03	N/A	Travers Bushfire and Ecology	24 April 2023
Watercourse Assessment Report	21HANG03W	N/A	Travers Bushfire and Ecology	24 April 2023
Arborist Report (2)	240222_150 – 152 Briens_AIA R7	7	Urban Arbor	22 February 2024
Sydney Water – Attachment 1	N/A	N/A	Sydney Water	13 February 2023
DPE – Water	IDAS-2023-10292 - Integrated Development Referral – General Terms of Approval	N/A	DPE – Water	15 December 2023

In the event of any inconsistency between the approved plans and the supporting documentation, the approved plans prevail. In the event of any inconsistency between the approved plans and a condition of consent, the condition prevails.

Note: An inconsistency occurs between an approved plan and supporting documentation or between an approved plan and a condition when it is not possible to comply with both at the relevant time.

Reason: To ensure all parties are aware of the approved plans and supporting documentation that applies to the development

2. Prior to commencement of any construction works associated with the approved development (including excavation if applicable), it is mandatory to obtain a Construction Certificate. Plans, specifications and relevant documentation accompanying the Construction Certificate must include any requirements imposed by conditions of this Development Consent.

   Reason: To ensure compliance with legislative requirements.

3. The development must be constructed within the confines of the property boundary. No portion of the proposed structure, including footings/slabs, gates and doors during opening and closing operations must encroach upon Council's footpath area or the boundaries of the adjacent properties.

   Reason: To ensure no injury is caused to persons and the building is erected in accordance with the approval granted within the boundaries of the site.

4. Before the issue of a Construction Certificate, the applicant is to ensure that the person liable pays the Long Service Levy of 0.25% of the value of building and construction work where the cost of building is $250,000 or more (inclusive of GST) or as calculated at the date of this consent to the Long Service Corporation or Council under section 34 of the *Building and Construction Industry Long Service Payments Act 1986* and provides proof of this payment to the Certifier.

Note: The Long Service Levy is to be paid directly to the Long Service Corporation at www.longservice.nsw.gov.au. For more information, please contact the Levy support team on 13 14 41.
Reason: To ensure that the Long Service Levy is paid.

5. Following issuing of any operative consent for the site physical commencement must occur in accordance with the requirements of Section 95(4) of the Environmental Planning and Assessment Act within 5 years of the date of the issue of the deferred commencement consent. In this regard should physical commencement not occur by <insert date 5 years from issue of deferred consent> the consent will lapse.

6. The approved works is to be in compliance with the General Terms of Approval as issued by the NSW Department of Planning and Environment – Water as contained within its correspondence dated 15 December 2023 and as attached within Condition 1 of this consent.
Reason: To ensure compliance with requirements of DPE – Water.

7. No materials, vehicles, refuse skips and the like are to be placed or stored in the adjoining or adjacent public reserve.
Reason: To ensure public safety and protect the amenity of public land.

8. No trees on public property (footpaths, roads, reserves etc.) are to be removed or damaged during construction including for the erection of any fences, hoardings or other temporary works, unless approved in this consent.
Reason: To ensure adequate protection of existing environmental assets and to maintain public amenity.

9. No works or vehicular access are permitted within the adjoining Council reserve during works without the prior written consent of Council.
Reason: To ensure public safety and protect the amenity of public land.

10. All stormwater headwall outlets into the watercourse are to be constructed in accordance with Department of Planning and Environment 'Guidelines for Outlet Structures' and Councils 'Stormwater Outlet Natural Waterway Standard Detail'. They are to be directed downstream and incorporate stacked sandstone boulders, flow velocity reduction and filtration controls (i.e. bedded boulders and native sedges / rushes) to minimise potential erosion and scouring impacts from high flows and ensure a natural and stable transition from a constructed drainage system to a natural flow regime.
Reason: To ensure protection of riparian vegetation and waterways.

11. Separate waste processing and storage facilities are to be provided for the individual tenancies of the industrial development. These facilities should be designed and located so that they cannot be accessed by the public, and are accessible by a private waste contractor for collection. A caretaker is to be appointed by the managing body to be responsible for the management of all waste facilities.
Reason: To ensure waste is adequately separated and managed in mixed use developments.

12. All waste storage rooms/areas are to be fully screened from public view and are to be located clear of all landscaped areas, driveways, turning areas, truck standing areas and

car parking spaces. No materials, waste matter or products are to be stored outside the building or any approved waste storage area at any time.
Reason: To maintain the amenity of the area.

13. The following is to be undertaken per the recommendations of Transport for NSW:

    1. The car/truck exit driveway shall be restricted to left-out only by installing sings and line markings.
    2. The post-development stormwater discharge from the subject site into the TfNSW drainage system must not exceed the pre-development discharge. Should the post-development stormwater discharge exceed pre-development discharge, please submit detailed design plans and hydraulic calculations including the following, detailing any changes to the TfNSW stormwater drainage system to TfNSW via development.sydney@transport.nsw.gov.au for approval, prior to the commencement of any works:
        - Details of the pre and post-discharge; and
        - Details of the anticipated storm water discharge - in l/s- for the 1 in 5, 10, 20, and 100 storm events (to be shown in table form on the drawing). Please note a plan checking fee will be payable and a performance bond may be required before TfNSW approval is issued.
    3. The developer is to submit design drawings and documents relating to the excavation of the site and support structures to TfNSW for assessment, in accordance with Technical Direction GTD2012/001. The developer is to submit all documentation at least six (6) weeks prior to commencement of construction and is to meet the full cost of the assessment by TfNSW. Please send all documentation to development.sydney@development.nsw.gov.au

       If it is necessary to excavate below the level of the base of the footings of the adjoining roadways, the person acting on the consent shall ensure that the owner/s of the roadway is/are given at least seven (7) day notice of the intention to excavate below the base of the footings. The notice is to include complete details of the work.

    4. The site front Mons Road on the north-eastern boundary of the site and Mons Road is a classified transitway. Access is denied across this boundary.

    5. Any public domain works within the vicinity of the signalised intersection on Mons Road and Briens Road may require modification to the existing Traffic Control Signal plan. The Traffic Control Signal (TCS) plans shall be drawn by a suitably qualified person and endorsed by a suitably qualified practitioner. The submitted design shall be in accordance with Austroads Guide to Road Design in association with relevant TfNSW supplements (available on www.transport.nsw.gov.au). The certified copies of the TCS design and civil design plans shall be submitted to TfNSW for consideration and approval prior to the release of a Construction Certificate and commencement of road works. Please send all documentation to development.sydney@transport.nsw.gov.au. TfNSW fees for administration, plan checking, civil works inspections and project management shall be paid by the developer prior to the commencement of works. The developer may be required to enter into a Works Authorisation Deed (WAD) for the abovementioned public domain works.

6. The swept path of the longest vehicle entering and exiting the subject site, as well as manoeuvrability through the site, shall be in accordance with AUSTROADS. In this regard, a plan shall be submitted to Council for approval, which shows that the proposed development complies with this requirement, noting kerbside parking on Briens Road may restrict vehicular sightlines to incoming eastbound traffic in the northern lane.

7. A construction zone will not be permitted on Mons Road.

8. The developer shall be responsible for all public utility adjustment/relocation works and as necessitated by the above work and as required by the various public utility authorities and/or their agents. 9. A Road Occupancy Licence (ROL) should be obtained from Transport Management Centre for any works that may impact on traffic flows on Mons Road during construction activities. A ROL can be obtained through https://myrta.com/oplinc2/pages/security/oplincLogin.jsf

Reason: To satisfy TfNSW requirements

14. All works must be carried out so that:
(a) No materials are eroded, or likely to be eroded, are deposited, or likely to be deposited, on the bed or shore or into any waterway; and
(b) No materials are likely to be carried by natural forces to the bed, shore or waters of any waterway.
Any material that does enter any waterway must be removed immediately.
Reason: To ensure protection of waterways.

15. The proposed stormwater pipeline is to service only the subject property. It will become part of this property and all responsibility to maintain pipeline in condition to carry out intended design function will rest with the owners of the property.
Note: It will not become part of Council stormwater drainage system.
Reason: Per Council's Catchment Management Requirements.

16. All responsibility to maintain the stormwater drainage system within the easement rests with the beneficiaries of the easement.
Note: Council has no responsibility in this regard.
Reason: Per Council's Catchment Management Requirements.

17. The stormwater drainage system within the easement must be designed to withstand all loads resulting from all activities carried out by Council to maintain and care for the Reserve. The beneficiaries of the easement is responsible for all cost and work to repair/reinstate all damage to the stormwater drainage system resulting from any such activity. Council will have no responsibility in this regard.

Note: The beneficiaries of the easement shall agree to Council approving any future connection/alteration to the stormwater drainage system within the easement provided it will not detrimentally affect the operation and condition of the system.
Reason: Per Council's Catchment Management Requirements.

18. Trees to be retained and protected are listed within the Arboricultural Impact Assessment report by Urban Arbor 230413_150-152 Briens_AIA_R7 dated 22 February 2024.
Reason: To protect significant trees which contribute to the landscape character of the area.

19. Trees equal to or greater than five (5) metres in height, which are protected under City of Parramatta Council Development Control Plan 2011 (Part 5.4 Preservation of Trees or Vegetation), must not be removed or damaged without Council consent.
Reason: To preserve existing landscape features.

20. All fill imported onto the site shall be validated to ensure the imported fill is suitable for the proposed land use from a contamination perspective. Fill imported on to the site shall also be compatible with the existing soil characteristic for site drainage purposes.

Council may require details of appropriate validation of imported fill material to be submitted with any application for future development of the site. Hence all fill imported onto the site should be validated by either one or both of the following methods during remediation works:

(a) Imported fill should be accompanied by documentation from the supplier which certifies that the material is not contaminated based upon analyses of the material for the known past history of the site where the material is obtained; and/or
(b) Sampling and analysis of the fill material shall be conducted in accordance with NSW EPA (1995) Sampling Design Guidelines
Reason: To ensure imported fill is of an acceptable standard

21. Any new information which comes to light during remediation, demolition or construction works which has the potential to alter previous conclusions about site contamination shall be notified to the Council and the principal certifying authority immediately.
Reason: To ensure that the land is suitable for its proposed use and poses no risk to the environment and human health.

22. Groundwater shall be analysed for pH and any contaminants of concern identified during the preliminary or detailed site investigation, prior to discharge to the stormwater system. The analytical results must comply with relevant NSW EPA water quality standards and Australian and New Zealand Guidelines for Fresh and Marine Water Quality.

Other options for the disposal of groundwater include disposal to sewer with prior approval from Sydney Water or off-site disposal by a liquid waste transporter for treatment/disposal to an appropriate waste treatment/processing facility.
Reason: To ensure that contaminated groundwater does not impact upon waterways.

PART B – BEFORE THE ISSUE OF A CONSTRUCTION CERTIFICATE

(Note: Some conditions contained in other sections of this consent (including prior to occupation/use commencing) may need to be considered when preparing detailed drawings/specifications for the Construction Certificate.)

23. An Infrastructure and Restoration Administration Fee must be paid to Council prior to the issue of a Construction Certificate.

The fee will be in accordance with Councils adopted 'Fees and Charges' at the time of payment.
Note: Council's Customer Service Team can advise of the current fee and can be contacted on 9806 5524.
Reason: To comply with Council's adopted Fees and Charges Document and to ensure compliance with conditions of consent.

24. A monetary contribution comprising **$373,242.99** is payable to City of Parramatta Council in accordance with Section 7.11 of the Environmental Planning and Assessment Act 1979 and the *City of Parramatta (Outside CBD) Development Contributions Plan 2021 Amendment 1*. Payment must be made by direct bank transfer or credit/debit card only. Payment can be made by contacting Council's Customer Contact Centre on 1300 617 058.

Contribution Type	Amount
Open space and outdoor recreation	$ 150,279.79
Traffic and transport	$ 211,941.23
Plan administration	$ 11,021.97
Total	**$ 373,242.99**

Timing of payment

The contribution is to be paid to Council prior to Construction Certificate. Deferred payments of contributions will not be accepted, and requests for payment by multiple instalments will not be granted.

The contribution levy is subject to indexation on a quarterly basis in accordance with movements in the Consumer Price Index (All Groups Index) for Sydney issued by the Australian Statistician. At the time of payment, the contribution levy may have been the subject of indexation.

The *City of Parramatta (Outside CBD) Development Contributions Plan 2021 Amendment 1*. can be viewed on Council's website at: https://www.cityofparramatta.nsw.gov.au/business-development/planning/development-contributions
Reason: To comply with legislative requirements and to provide for the increased demand for public amenities and services resulting from the development.

25. Before the commencement of any works on the site or the issue of a construction certificate, the applicant must make all of the following payments to Council and provide written evidence of these payments to the certifier:

Bond Type	Amount
Nature Strip and Roadway: x 2 street frontages (ie $25, 750 per frontage)	$51,500

The payments will be used for the cost of:

- making good any damage caused to any council property (including street trees) as a consequence of carrying out the works to which the consent relates,
- completing any public work such as roadwork, kerbing and guttering, footway construction, stormwater drainage and environmental controls, required in connection with this consent, and
- any inspection carried out by Council in connection with the completion of public work or the making good any damage to council property.

Note: The inspection fee includes Council's fees and charges and includes the Public Road and Footpath Infrastructure Inspection Fee (under the Roads Act 1993). The amount payable must be in accordance with council's fees and charges at the payment date.

Note: The bond may be paid, by EFTPOS, bank cheque, or be an unconditional bank guarantee.

Should a bank guarantee be lodged it must:
(a) Have no expiry date;
(b) Be forwarded directly from the issuing bank with a cover letter that refers to Development Consent DA 19/2023
(c) Specifically reference the items and amounts being guaranteed. If a single bank guarantee is submitted for multiple items it must be itemised.

Should it become necessary for Council to uplift the bank guarantee, notice in writing will be forwarded to the applicant fourteen days prior to such action being taken. No bank guarantee will be accepted that has been issued directly by the applicant.

A dilapidation report is required to be prepared and submitted electronically to the City of Parramatta Council (council@cityofparramatta.nsw.gov.au) prior to any work or demolition commencing and with the payment of the bond/s.

The dilapidation report is required to document/record any existing damage to kerbs, footpaths, roads, nature strips, street trees and furniture within street frontage/s bounding the site up to and including the centre of the road.

26. The PCA shall ascertain that any new element in the carpark not illustrated on the approved plans such as columns, garage doors, fire safety measures and the like do not compromise appropriate manoeuvring and that compliance is maintained with AS 2890.1, AS 2890.2 and AS 2890.6. Details are to be illustrated on plans submitted with the construction certificate application.
Reason: To ensure appropriate vehicular manoeuvring is provided.

27. 45 bicycle spaces/racks are to be provided on-site and used accordingly. The bicycle storage/racks are to comply with AS 2890.3-2015. Details are to be illustrated on plans submitted with the construction certificate.
Reason: To comply with Council's parking requirements.

28. Parking spaces are to be provided in accordance with the approved plans and with AS 2890.1, AS 2890.2 and AS 2890.6. A total of 61 parking spaces is to be provided and be allocated as follows:
a) 55 parking spaces for warehouses;
b) Six (6) parking spaces for storage units including one (1) sapce as accessible parking.

Details are to be illustrated on plans submitted with the construction certificate application.
Reason: To comply with Council's parking requirements and Australian Standards.

29. A splay extending 2m from the driveway edge along the front boundary and 2.5m from the boundary along the driveway in accordance with Figure 3.3 of AS2890.1 shall be provided to give clear sight lines of pedestrians from vehicles exiting the site. This shall be illustrated on plans submitted with the construction certificate and not be compromised by the landscaping, signage fences, walls or display materials.
Reason: To comply with Australian Standards and ensure pedestrian safety.

30. Prior to the issue of the Construction Certificate, the Project Arborist and Certifying Authority must be satisfied the installation of drainage pipes within the Tree Protection Zones (TPZ) of trees 7, 8, 43, 50 are to be installed using non-destructive construction method such as hydro-vac or careful hand-dig to retain all roots over 30mm in diameter. Pipes are to be treaded through roots. Notes and Tree Protection Zones to be added to the plans (refer to the Arboricultural Impact Assessment Report by Urban Arbor 230413_150-152 Briens_AIA_R6 dated 13.04.23) for TPZ radius's.

    In addition to the above, the design and construction of the swale must demonstrate only mounding of additional soil fill above natural ground level is to be used to create the overland flow path within the TPZ of trees numbered 53 - 78. No edging, excavation, compaction or regrading is to occur within the TPZ radius's as per the table. Note, all additional soil fill is to be pulled back by a minimum 200mm from the base of the tree trunk.

    In addition, prior to the issue of the Construction Certificate, the Certifying Authority and Project Arborist must be satisfied the design of the (gravel) footpath, within the Tree Protection Zone (TPZ) of trees numbered 53 – 78 must demonstrate it is to be built above the natural grade to avoid severing roots. No compaction to the subbase is to occur. The design must demonstrate no edging, excavation, or regrading is to occur within the existing natural ground of the TPZ of these trees.

    All designs for these construction works will need to be pre-approved and done in consultation with the Project Arborist before they are issued for Construction Certificate to ensure they have minimised the impact to the tree roots within the Tree Protection Zone (TPZ) to below 10% encroachment as per the AS4970-2009 *Protection of trees on development sites*. Once all adequate design amendments have been made, plans submitted with the Construction Certificate application must reflect the above requirements.
    Reason: To ensure adequate protection of existing trees.

31. Prior to the issue of Construction Certificate, a Tree Protection Management Plan (TPMP), prepared by a suitably qualified Consulting Arborist (Australian Qualification Framework Level 5), must accompany the application for a Construction Certificate. This TPMP is to identify specific tree protection measures to be implemented for the trees located adjacent to the site during demolition and construction and the expected future health of the trees. The TPMP must discuss the specific non-destructive construction method to minimise the impact and encroachment and discuss the specific protection measures required throughout the demolition and construction works. It should cover all stages of the works and cover any works to be supervised by the Project Arborist including:

- A tree protection plan to identify the tree protection type and location required for each tree inclusive of canopy, trunk and tree root protection in accordance with AS 4970-2009 - *Protection of Trees on Development Sites*;
- Supervision of any excavation to be undertaken within the calculated Tree Protection Zones of the trees to be retained and protected
- Discuss any services to be installed within the TPZ of trees must be carried out using non-destructive construction techniques (i.e. bridging of roots);
- Construction of any structure which requires a footing;
- Landscaping (i.e. minimise cultivation, excavation planting techniques within the TPZ & SRZ);

Reason: To ensure adequate protection of existing trees.

32. Plans and documents submitted must include the following with an application for a Construction Certificate:
    (a) Construction details are to be provided by a suitably qualified structural engineer showing substrate depth, drainage, waterproofing for all planting on structures, including planting over on-site detention tanks, raised planters and rooftop gardens. All raised planting boxes must be retained to a minimum height of 600mm.
    (b) Soil volume, soil depth and soil area must meet the prescribed standards in "Apartment Design Guide – tools for improving the design of residential apartment development" (NSW Department of Planning and Environment, 2015).
    (c) A specification ('Fit-for-purpose' performance description) for soil type and a maintenance schedule specified by a suitably qualified Soil Scientist, to ensure sufficient nutrient and water availability is achieved.

    Reason: To ensure the creation of functional gardens.

33. All roof water and surface water is to be connected to an operable drainage system. Details are to be shown on the plans and documentation accompanying the application for a Construction Certificate.
    Reason: To ensure satisfactory stormwater disposal.

34. If no retaining walls are marked on the approved plans no approval is granted as part of this approval for the construction of any retaining wall that is greater than 600mm in height or within 900mm of any property boundary.

    The provision of retaining walls along common boundary lines shall not impact on neighbouring properties. If impact upon neighbouring properties (including fences) is anticipated, then written approval from the affected neighbour shall be obtained and submitted to the certifying authority prior commencement of the works.

    Structural details, certified by a practicing structural engineer, shall accompany the application for a Construction Certificate for assessment and approval by the certifying authority.
    Reason: To minimise impact on adjoining properties.

35. A building plan approval must be obtained from Sydney Water Tap in™ to ensure that the approved development will not impact Sydney Water infrastructure.

    A copy of the building plan approval receipt from Sydney Water Tap in™ must be submitted to the Principal Certifying Authority upon request prior to works commencing.

Please refer to the website http://www.sydneywater.com.au/tapin/index.htm, Sydney Water Tap in™, or telephone 13 20 92.
Reason: To ensure the requirements of Sydney Water have been complied with.

36. Prior to any excavation on or near the subject site the person/s having benefit of this consent are required to contact the NSW Dial Before You Dig Service (NDBYD) on 1100 to receive written confirmation from NDBYD that the proposed excavation will not conflict with any underground utility services. The person/s having the benefit of this consent are required to forward the written confirmation from NDBYD to their Principal Certifying Authority (PCA) prior to any excavation occurring.
Reason: To ensure Council's assets are not damaged.

37. The building must be designed and certified by a registered structural engineer to ensure the building does not fail due to floodwater forces, debris and buoyancy effects from flooding in events up to the 1 in 100 year level plus 500mm freeboard.
Reason: To ensure the structure can withstand flooding impacts.

38. The building must include a flood warning alarm system activated by a float valve. Details must be provided to the satisfaction of the Certifying Authority prior to issue of the Construction Certificate.
Reason: To ensure the flood warning system is installed.

39. Full engineering construction details of the stormwater system, including OSD structures, pipe networks and calculations as per the following points, shall be submitted for the approval of the PCA prior to release of the Construction Certificate for any work on the site.

    (a) The stormwater drainage detail design shall be prepared by a Registered Stormwater Design Engineer and shall be generally in accordance with Council's Stormwater Disposal Policy, Council's Design and Development Guidelines, The Upper Parramatta River Catchment Trust On Site Detention Hand book (Third or Fourth Edition), the relevant Australian Standards and the National Construction Code.

    (b) A Site Storage Requirement of 470 m3/ha and a Permissible Site Discharge of 80 L/s/ha (when using 3rd edition of UPRCT's handbook) OR The Site Reference Discharge (Lower Storage), SRDL of 40L/s/ha, Site Storage Requirement (Lower Storage) SSRL of 300m 3/ha, Site Reference Discharge (Upper Storage), SRDU of 150 l/s/ha, Site Storage Requirement (Total) SSRT of 455m3/ha (when using the Extended/Flood detention method - 4th edition of UPRCT's handbook unless Council has been satisfied with report prepared by a suitably qualified and experienced chartered professional engineer has been submitted to Council using a calibrated hydrologic model acceptable to the Trust, assume development and/or redevelopment of a significant portion of the principal catchment containing the subject site, consider a range of storm durations and frequencies for all flood events, in particular the 1.5 year ARI and the 100 year ARI (1% AEP) storm event; and show that the flood peak discharges at all downstream locations are not increased and written confirmation from Council is supplied with the plans to this effect.

(c) The piped drainage system shall be designed with capacity for the 1% AEP design storm event.

(d) Adequate grate(s) to be provided so the OSD tank storage area can be inspected from outside for silt and debris, and to ensure adequate cross ventilation within the tank.

(e) The OSD tank shall include a provision for any surcharge of the OSD tank to be directed to a surface flow path through the site and towards the point of discharge.

(f) Where possible, overflows of the piped drainage system shall be directed to the OSD storage with surface flowpaths.

(g) Certificate from registered structural engineer certifying the structural adequacy of the OSD tank structure.

(h) The stormwater plans shall be finalised and red marking should be made final in black text, so it does not cause confusion with Works as executed plans. A finalised copy of stormwater plans shall be submitted to the certifying authority for approval.

Reason: To minimise the quantity of storm water run-off from the site, surcharge from the existing drainage system and to manage downstream flooding.

40. The Stormwater treatment should be installed to achieve the requirements of the section 3.3.6.1 of Parramatta City Council Development Control Plan 2011 and generally approved as per the DA-approved stormwater drainage plan and the manufacturer's specifications and instructions to manage the quality of stormwater discharged from the site. Details of the proposed devices, their location and manufacturer's certification must accompany the application for a Construction Certificate to the satisfaction of the Certifying Authority. In this regard:
    a. Stormwater filter and other WSUD elements must be installed to manage surface runoff water quality as per the approved plans.
    b. The number and type of proposed water quality devices and Stormfilter cartridges are not to be reduced, nor replaced with an alternate manufacturer's product without the written approval from Council.
    c. Stormwater Treatment Measures for the proposed development shall be designed in accordance with the requirements of the devices manufacturer design guidelines. Details are to be included with the plans and specifications accompanying any Construction Certificate.
    d. A Maintenance Schedule must be provided for the stormwater treatment measures, including the rainwater tank, in accordance with the requirements of the manufacturer. The designer of the stormwater treatment measures must prepare the Maintenance Schedule and this schedule must show the designer's name, signature and date on it.
    e. The Water Management Strategy must demonstrate that all peak stormwater flows leaving the site for any given storm event are less than or equal to all pre-development stormwater flows for such storms up to the 1% AEP event. The Water Management Strategy must demonstrate overall discharge reduction by 10% from pre-development levels

Details of the proposed devices and Maintenance Schedule must accompany the application for a Construction Certificate to the satisfaction of the Certifying Authority.
Reason: To ensure appropriate water quality treatment measures are in place.

41. Where work is likely to disturb or impact upon utility installations, (e.g. power pole, telecommunications infrastructure etc.) written confirmation from the affected utility provider that they raise no objections to the proposed works must accompany an application for a Construction Certificate to the satisfaction of the Certifying Authority.
Reason: To ensure no unauthorised work to public utility installations and to minimise costs to Council.

42. Council property adjoining the construction site must be fully supported at all times during all demolition, excavation and construction works. Details of any required shoring, propping and anchoring devices adjoining Council property, are to be prepared by a qualified structural or geotechnical engineer. These details must accompany an application for a Construction Certificate and be to the satisfaction of the Principal Certifying Authority (PCA). A copy of these details must be forwarded to Council prior to any work being commenced.

    Backfilling of excavations adjoining Council property or any void remaining at the completion of the construction between the building and Council property must be fully compacted prior to the completion of works.
    Reason: To protect Council's infrastructure.

43. The grades of the driveway, including transitions, must comply with Australian Standard 2890.1 to prevent the underside of the vehicles scraping. Where the geometric change in grade exceeds 18%, the gradients of the driveway and ramps shall be checked using the method at Appendix C in AS2890.1:2004 and adjustments will be made to accommodate suitable transition lengths. Details are to be provided with the application for a Construction Certificate.
    Reason: To provide suitable vehicle access without disruption to pedestrian and vehicular traffic.

44. A heavy duty vehicular crossing shall be constructed in accordance with Council's Standard Drawing numbers DS9 and DS10. Details must accompany an application for a Construction Certificate to the satisfaction of the Certifying Authority.

    A Vehicle Crossing application must be submitted to Council together with the appropriate fee as outlined in Council's adopted Fees and Charges prior to any work commencing.
    Reason: To ensure appropriate vehicular access is provided.

45. Prior to the commencement of any work, including bulk earthworks and construction works the applicant/developer is to approach the NSW State Heritage Office to satisfy any archaeological requirements for the site. This may include a preliminary archaeological assessment or a request for an exemption permit.

    A copy of the written correspondence from the Heritage Office confirming that their requirements have been satisfied shall be provided to Council and the Principal Certifying Authority prior to the issue of the construction certificate.

Reason: To ensure that the requirements of the Heritage Office are met and any European archaeological items are preserved.

46. Prior to the issue of a Construction Certificate, a Construction Environmental Management Plan (CEMP) for stormwater works within the Council bushland reserve must be prepared by a suitably qualified person and submitted to Council for approval by the Parks and Open Space or Natural Areas delegate. The CEMP must include (but not be limited to) the following:
    a) Safe methods of access to and from the Council's reserve during stormwater easement works;
    b) Method of loading and unloading excavation machinery and construction materials;
    c) Storage location and details of construction materials, excavated soil and other waste materials;
    d) Methods to prevent materials being tracked into the surrounding bushland;
    e) Erosion and sediment control measures;
    f) Tree protection measures consistent with conditions of this development consent; and
    g) A statement confirming that the environmental management measures set out in the CEMP would remain in place and be maintained for the duration of easement works and until disturbed areas have been stabilised/revegetated with indigenous species in consultation with Council's Parks and Open Space or Natural Areas delegate.

    Reason: To ensure protection of Council's reserve during construction.

47. Prior to the issue of a construction certificate a further report including accompanying plans shall be submitted to the satisfaction of the Principal Certifying Authority that provides details of the private contractor that will be engaged to collect domestic waste from the site. If Council is not the principal certifying authority a copy of this report and accompanying plans is required to be provided to Council. This report shall identify the frequency of collection and provide details of how waste products including paper, aluminium cans, bottles etc, will be re-cycled. Waste collection from the site shall occur in accordance with the details contained within this report.

    Reason: To provide for the appropriate collection/ recycling of waste from the proposal whilst minimising the impact of the development upon adjoining residents.

48. Separate waste bins are to be provided on site for recyclable waste.
    Reason: To provide for the appropriate collection/ recycling of waste from the proposal whilst minimising the impact of the development upon adjoining residents.

49. A noise management plan must be submitted to Council for approval prior to any work commencing and complied with during any construction works. The plan must be prepared by a suitably qualified person, who possesses qualifications to render them eligible for membership of the Australian Acoustic Society, Institution of Engineers Australia or the Australian Association of Acoustic Consultants.

    The plan must include, but not be limited to the following:
    (a) Confirmation of the level of community engagement that has, is and will be undertaken with the Building Managers/occupiers of the main adjoining noise

sensitive properties likely to be most affected by site works and the operation of plant/machinery particularly during the demolition and excavation phases..

(b) Confirmation of noise, vibration and dust monitoring methodology that is to be undertaken during the main stages of work at neighbouring noise sensitive properties during the main stages of work at neighbouring noise sensitive

(c) What course of action will be taken following receipt of a complaint concerning site noise, dust and vibration?

(d) Details of any noise mitigation measures that have been outlined by an acoustic engineer or otherwise that will be deployed on site to reduce noise impacts on the occupiers of neighbouring properties to a minimum.

(e) What plant and equipment is to be used on the site, the level of sound mitigation measures to be undertaken in each case and the criteria adopted in their selection taking into account the likely noise impacts on the occupiers of neighbouring properties and other less intrusive technologies available.

Reason: To maintain appropriate amenity to nearby occupants

50. The basement stormwater pump-out system, must be designed and constructed to include the following:

(a) A holding tank capable of storing the run-off from a 100 year ARI (average reoccurrence interval) - 2 hour duration storm event, allowing for pump failure.

(b) A two pump system (on an alternate basis) capable of emptying the holding tank at a rate equal to the lower of:

(i)The permissible site discharge (PSD) rate; or

i.The rate of inflow for the one hour, 5 year ARI storm event.

(c) An alarm system comprising of basement pump-out failure warning sign together with a flashing strobe light and siren installed at a clearly visible location at the entrance to the basement in case of pump failure.

(d) A 100 mm freeboard to all parking spaces.

(e) Submission of full hydraulic details and pump manufacturers specifications.

(f) Pump out system to be connected to a stilling pit and gravity line before discharge to the street gutter.

Plans and design calculations along with certification from the designer indicating that the design complies with the above requirements are to be submitted to the satisfaction of the Principal Certifying Authority prior to issue of the Construction Certificate.

Reason: To ensure satisfactory storm water disposal.

51. A standard vehicular crossing shall be constructed in accordance with Council's Standard Drawing numbers DS8 and DS10. Details must accompany an application for a Construction Certificate to the satisfaction of the Certifying Authority.

A Vehicle Crossing application must be submitted to Council together with the appropriate fee as outlined in Council's adopted Fees and Charges prior to any work commencing.

Reason: To ensure appropriate vehicular access is provided.

52. Foundations adjacent to a drainage easement and/or pipe are to be constructed in accordance with Council's Code "Foundation Requirements for Structures Adjacent to Council Stormwater Drainage Easements – Parramatta City Council Code E-3". The engineering details are to form part of the Construction Certificate documentation.

Reason: Construction adjacent to a drainage easement

53. The Stormwater treatment should be installed to achieve the requirements of the section 3.3.6.1 of Parramatta City Council Development Control Plan 2011 and generally approved as per the DA-approved stormwater drainage plan and the manufacturer's specifications and instructions to manage the quality of stormwater discharged from the site. Details of the proposed devices, their location and manufacturer's certification must accompany the application for a Construction Certificate to the satisfaction of the Certifying Authority. In this regard:
    a. Stormwater filter and other WSUD elements must be installed to manage surface runoff water quality as per the approved plans.
    b. The number and type of proposed water quality devices and Stormfilter cartridges are not to be reduced, nor replaced with an alternate manufacturer's product without the written approval from Council.
    c. Stormwater Treatment Measures for the proposed development shall be designed in accordance with the requirements of the devices manufacturer design guidelines. Details are to be included with the plans and specifications accompanying any Construction Certificate.
    d. A Maintenance Schedule must be provided for the stormwater treatment measures, including the rainwater tank, in accordance with the requirements of the manufacturer. The designer of the stormwater treatment measures must prepare the Maintenance Schedule and this schedule must show the designer's name, signature and date on it.
    e. The Water Management Strategy must demonstrate that all peak stormwater flows leaving the site for any given storm event are less than or equal to all pre-development stormwater flows for such storms up to the 1% AEP event. The Water Management Strategy must demonstrate overall discharge reduction by 10% from pre-development levels

    Details of the proposed devices and Maintenance Schedule must accompany the application for a Construction Certificate to the satisfaction of the Certifying Authority.
    Reason: To ensure appropriate water quality treatment measures are in place.

54. All basements shall be constructed with 'tanked' (waterproof) construction methods to ensure groundwater does not penetrate the basements and basement walls and floor slabs do not fail as a result of hydrostatic loading. Pumped or drained basements are not supported. Council will not accept discharge of groundwater post-construction into Council's stormwater system or the Parramatta River. Council may accept discharge of treated groundwater into Council's drainage system during construction only if this is subject to a Construction Environmental Management Plan satisfactory to Council. Details are to be submitted for the approval of the Group Manager DTSU prior to release of any Construction Certificate.

    The landowner shall manage groundwater inflows and outflows during construction and thereafter in perpetuity, including monitoring, to ensure all of Council and NSW Government requirements are satisfied and that there are no adverse effects on the environment and public health, including water table levels, surface and groundwater flow regimes, contamination and pollution, flooding and water quality and structural stability. Note Council does not permit long term discharge of groundwater to Council's stormwater system.
    Reason: Groundwater risk management

55. Public Domain Construction Drawings

Before the issue of a Construction Certificate for any construction work relating to the public domain works or any publicly accessible internal site works, a set of detailed **Public Domain Construction Drawings** as per Chapter 2 of the Parramatta Public Domain Guidelines, must be submitted to and approved by Council's Development and Traffic Services Unit (DTSU) Manager. The drawings shall address, but not be limited to, the following areas:

- All the frontages of the development site between the gutter and building line, including footpath, drainage, forecourt, and front setback.
- Any publicly accessible areas,
- Any works in the carriageway,
- Works to integrate with adjacent public amenities, and
- Onsite landscape work

Grading of the pedestrian footway:

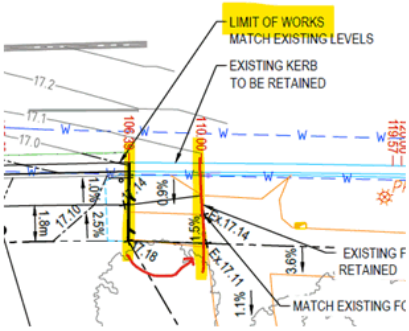
- Localised flattening of public footpath levels at building doorways is not permitted. Any change of level required to provide compliant access to the building must be achieved behind the property boundary line.
- Localised ramps are not permitted in the footway. Longitudinal grading must follow the gradient of the top of kerb line unless agreed otherwise with the Council. Ramping of the footway to suit adjacent building entry/access requirements will not be accepted.

The Public Domain Construction Drawings and specifications shall be prepared as per:

- The latest City of Parramatta Public Domain Guidelines (PPDG).
- The approved public domain drawings - Landscape Public Domain Plan - PD_000 B, PD_101 B, PD_501 A, and PD_502 A by Site Image Landscape Architects
- The approved public domain alignment drawings – Road Reserve drawings and Road cross sections – Drg. No. 22Q77_DA_C110, C130,C131 and C132 by Henry and Hymas
- All the conditions listed in this consent.

The Public Domain Construction Drawings must be prepared to reflect the following changes:

- A 1.5m footpath instead of the 1.8m footpath shown in the above approved Public Domain and alignment drawings is deemed suitable.
- The maximum crossfall is to be 2.5% to the new footpath.
- The footpath is to transition seamlessly into the existing footpath.
- The footpath should connect to the existing shared path along Mon's road. Ensure the pedestrian walkway connection to Mons Road is achieved. The limit of work shown in the drawing should extend to the shared path.



56. Footway Specifications

Notwithstanding the approved Public Domain Drawings and Alignment Drawings, the following requirements shall be included in the Public Domain Construction Drawings:

Footpath
The **standard concrete paving**, as per the PDG and Council Standard detail DS 3, shall be applied to Briens Road to the full length of the development site. Detailed design spot levels are required. A footpath width of 1500 mm is required.
A new kerb and gutter and new verge installation are required as part of these works.
A copy of the Design Standard (DS) Drawings referenced above is available on the Council Website (https://www.cityofparramatta.nsw.gov.au/sites/council/files/2023-02/SD-INDEX-FINAL.pdf) or can be obtained from Council's Customer Service department on 9806 5050, Mon – Fri (8:30 am-4:30 pm).

Vehicle Crossing
The council's standard vehicle crossing is to be provided. Refer to the Council's design standards DS9 and DS 10.

Pit Lids, Frames and Grates
All Pit lids and grates in paved areas of the public domain should be level with the paving around and aligned with the paving pattern as per the PDG. Joints should be coordinated where possible. Where allowed by the service providers, the pit lids should be infilled with the surrounding paving material. **All Pit lids, frames and covers in the public domain must be of Class 'C' load bearing capacity as per AS 3996 and DS 25 in all pedestrian areas and Class 'D' for all shared zones.**

Drainage grates on an accessible path of travel and within common areas, are to have slots or circular openings with a maximum width of 13mm. Slots are to be laid with the long dimension at right angles to the paths of travel.

Tactile Indicators (TGSI)
TGSIs must be used on the public footpath and comply with the requirements in the Public Domain Guidelines and the latest versions of AS1428.1 and AS1428.4. The TGSIs must be installed in the locations as shown on the approved Public Domain Construction Drawings.

Lighting

Pedestrian and Council-owned Street lighting shall comply with the City of Parramatta Street Lighting Guidelines 2019 and all relevant Australian Standards, including but not limited to AS1158.
All the lighting features in the public domain shall be detailed in the Public Domain Construction Documentation.
All new lighting designs shall be carried out and certified by a full member of IESANZ.

Electrical Reticulation:
Electrical design shall comply with AS/NZS3000 and, if any electricity distributor assets are involved, all requirements of the electricity distributor.
All electrical designs shall be undertaken by a competent practicing electrical engineer.
For Council-owned lighting, electrical design shall be submitted to the Council for review and approval.
The location of any distribution board is to be in a position off the public street, wherever possible, and out of the main path of travel. The location must be approved by the Council.
Electrical Design Certificate signed as compliant by ASP Level 3 designer.

Construction and General:
All new LED luminaires shall include a 7-pin NEMA socket.
All assets handed over to the Electrical Distributor must meet their relevant standards (Ausgrid Network Standard NS119 & Endeavour Energy Network Standard)
All assets handed over to the Council must meet the City of Parramatta Street Lighting Guidelines 2019
The Developer shall be responsible for reimbursing the Council for any residual values for assets removed prematurely.

Electrical Pillars
Green Pillars for electrical connections, where required, should be coordinated with public domain elements, be outside the clear path of travel, as shown on drawings, and must be neatly located 100mm away from the face of the building / property boundary wall (as applicable) and be installed square and plumb.
Any existing green pillars must be moved and relocated as necessary to achieve the above.

Documentary evidence of compliance with these requirements is to be confirmed in the **Public Domain Construction Drawings** to be submitted to and approved by the Council's DTSU Manager before the issue of the relevant Construction Certificate.
Reason: Per Urban Design – Public Domain Requirements.

57. The final Landscape Plan must be consistent with plans SS22-5068 rev G dated 04.08.2023 prepared by Site Image together with any additional criteria required by the Development Consent to the satisfaction of the Certifying Authority addressing the following requirements:

    (a) Minimum 10 x additional native trees to be added to the rear southern setback. These are to be added to the riparian mix or planting area at a minimum 6-8m centres. Suitable native species reflective of the adjacent River-flat Eucalyptus Forest include (but are not limited to) the following:
    • *Angophora floribunda* (Rough-barked apple)
    • *Melaleuca linariifolia (Narrow-leaves Paperbark)*

- *Melaleuca styphelioides* (Prickly-leaved tea tree)
- *Casuarina cunninghamiana* (River oak)
- *Eucalyptus amplifolia* (Cabbage Gum)

(a) Reposition trees (As - *Angophora subvelutina*) within the front setback to 5m centres.
(b) Delete the northern portion of the retaining wall within the landscape area (to the northern side of the entrance) to avoid clashing with the proposed tree rootball.
(c) The location of all overhead and underground service lines to be shown as per Henry & Hymas to ensure plans are coordinated.

Reason: To ensure restoration of environmental amenity.

PART C – BEFORE THE COMMENCEMENT OF BUILDING WORK

58. Prior to commencement of work, the person having the benefit of the Development Consent and Construction Certificate approval must:
(a) Appoint a Principal Certifying Authority (PCA) and notify Council in writing of the appointment (irrespective of whether Council or an accredited private certifier) within 7 days; and
(b) Notify Council in writing a minimum of 48 hours prior to work commencing of the intended date of commencement.

The Principal Certifying Authority must determine and advise the person having the benefit of the Construction Certificate when inspections, certification and compliance certificates are required.

Reason: To comply with legislative requirements.

59. The site must be enclosed by a 1.8m high security fence erected wholly within the confines of the site to prevent unauthorised access. The fence must be installed to the satisfaction of the Principal Certifying Authority prior to the commencement of any work on site.
Reason: To ensure public safety.

60. A sign must be erected in a prominent position on any site involving excavation, erection or demolition of a building in accordance with Clause 70 of the Environmental Planning and Assessment Regulations 2021 detailing:
(a) Unauthorised entry of the work site is prohibited;
(b) The name of the principal contractor (or person in charge of the work site), their telephone number enabling 24hour contact; and
(c) The name, address and telephone number of the Principal Certifying Authority;
(d) The development consent approved construction hours;
(e) The sign must be maintained during excavation, demolition and building work, and removed when the work has been completed.
(f) This condition does not apply where works are being carried out inside an existing building.

Reason: Statutory requirement.

61. Prior to work commencing, adequate toilet facilities are to be provided on the work site.
Reason: To ensure adequate toilet facilities are provided.

62. Public risk insurance in the amount of not less than $20 million or such other amount as Council may require by notice) must be obtained and furnished to Council before any works authorised by this consent are conducted:
(a) Above;

(b) Below; or
(c) On

Any public land owned or controlled by Council. The public risk insurance must be maintained for the period during which these works are being undertaken.

The public risk insurance must be satisfactory to Council and list Council as an insured and/or interested party.

A copy of the insurance policy obtained must be forwarded to Council before any of the works commence.

Note: Applications for hoarding permits, vehicular crossing etc. will require evidence of insurance upon lodgement of the application.

Reason: To ensure the community is protected from the cost of any claim for damages arising from works authorised by this consent conducted above, below or on any public land owned or controlled by Council.

63. Prior to the commencement of any demolition, excavation or construction works, tree protection measures shall be installed in accordance with the Australian Qualifications Framework (AQF) Level 5 arborist recommendations as outlined in report No. Arboricultural Impact Assessment, prepared by Urban Arbor, dated 22.02.2024, reference 230413_150-152 Briens_AIA_R7 and all relevant conditions of this consent.
Reason: To ensure the protection of the existing trees on the site.

64. Consent from Council must be obtained prior to any pruning works being undertaken on any tree on site, or any trees located in adjoining properties.

All approved pruning works must be supervised by an Australian Qualifications Framework (AQF) Level 3 certified Arborist. This includes the pruning of any roots that are 30mm in diameter or larger.
Reason: To ensure the protection of the tree(s) to be retained.

65. Tree protection measures are to be installed prior to works commencing on site and are to be maintained throughout the demolition and construction works, under the supervision of an Australian Qualifications Framework (AQF) Level 5 Arborist in accordance with AS4970 - "*Protection of Trees on Development Sites*". Confirmation to be forwarded to the Certifying Authority to state tree protection measures were retained in place in accordance with the Conditions of Consent (unless prior approval from the Project Arborist was provided).
Reason: To ensure trees are protected during construction.

66. The mitigation measures outlined in the ecological report prepared by Travers Bushfire and Ecology, dated 24 April 2023 must be implemented prior to and during the construction process in accordance with the report.
Reason: To ensure biodiversity impacts are appropriately managed and mitigated.

67. Prior to the commencement of any works on site, the applicant must submit a Construction and Traffic Management Plan to the satisfaction of the Principle Certifying Authority. The following matters must be specifically addressed in the Plan:

(a) Construction Management Plan for the Site. A plan view of the entire site and frontage roadways indicating:
   (i) Dedicated construction site entrances and exits, controlled by a certified traffic controller, to safely manage pedestrians and construction related vehicles in the frontage roadways,
   (ii) Turning areas within the site for construction and spoil removal vehicles, allowing a forward entry and egress for all construction vehicles on the site,
   (iii) The locations of proposed Work Zones in the egress frontage roadways,
   (iv) Location of any proposed crane standing areas,
   (v) A dedicated unloading and loading point within the site for all construction vehicles, plant and deliveries,
   (vi) Material, plant and spoil bin storage areas within the site, where all materials are to be dropped off and collected,
   (vii) The provisions of an on-site parking area for employees, tradesperson and construction vehicles as far as possible.
   (viii) A detailed description and route map of the proposed route for vehicles involved in spoil removal, material delivery and machine floatage and a copy of this route is to be made available to all contractors.
   (ix) A detailed description of locations that will be used for layover for trucks waiting to access the construction site.

(b) Written concurrence from Council's Traffic and Transport Services in relation to installation of a proposed 'Works Zone' restriction in the egress frontage roadways of the development site.

   Application fees and kerbside charges for 6 months (minimum) are to be paid in advance in accordance with the Council's Fees and Charges. The 'Works Zone' restriction is to be installed by Council once the applicant notifies Council in writing of the commencement date (subject to approval through Parramatta Traffic Committee processes). Unused fees for kerbside charges are to be refunded once a written request to remove the restriction is received by Council.

(c) Traffic Control Plan(s) for the site:
   (i) All traffic control devices installed in the road reserve shall be in accordance with the NSW Transport Roads and Maritime Services publication 'Traffic Control Worksite Manual' and be designed by a person licensed to do so (minimum RMS 'red card' qualification) The main stages of the development requiring specific construction management measures are to be identified and specific traffic control measures identified for each,
   (ii) Approval shall be obtained from City of Parramatta Council for any temporary road closures or crane use from public property.

(d) Where applicable, the plan must address the following:
   (i) Evidence of Roads and Maritime Services concurrence where construction access is provided directly or within 20 m of an Arterial Road,
   (ii) A schedule of site inductions shall be held on regular occasions and as determined necessary to ensure all new employees are aware of the construction management obligations.
   (iii) Minimising construction related traffic movements during school peak periods.

The Construction and Traffic Management Plan shall be prepared by a suitably qualified and experienced traffic consultant and be certified by this person as being in accordance with the requirements of the abovementioned documents and the requirements of this condition.

Reason: To ensure that appropriate measures have been considered during all phases of the construction process in a manner that maintains the environmental amenity and ensures the ongoing safety and protection of people.

68. The applicant must apply for a road-opening permit where a new pipeline is proposed to be constructed within or across Council owned land. Additional road opening permits and fees may be necessary where connections to public utilities are required (e.g. telephone, electricity, sewer, water or gas).

In addition, no drainage work can be carried out within the Council owned land without this permit being issued. A copy is required to be kept on site.

Reason: To protect Council's assets throughout the development process.

69. Prior to the commencement of any excavation works on site, the applicant must submit for approval by the Principal Certifying Authority (with an electronic copy forwarded to Council at council@cityofparramatta.nsw.gov.au) a dilapidation report on the visible and structural condition of all neighbouring structures within the 'zone of influence' of the excavation face to a depth of twice that of the excavation.

The report must include a photographic survey of the adjoining properties detailing their physical condition, both internally and externally, including such items as walls, ceilings, roof, structural members and other similar items. The report must be completed by a consulting structural/geotechnical engineer in accordance with the recommendation of the geotechnical report.

In the event access to adjoining allotments for the completion of a dilapidation survey is denied, the applicant must demonstrate in writing that all reasonable steps have been taken to advise the adjoining allotment owners of the benefit of this survey and details of failure to gain consent for access to the satisfaction of the Principle Certifying Authority.

Note: This documentation is for record keeping purposes only, and can be made available to an applicant or affected property owner should it be requested to resolve any dispute over damage to adjoining properties arising from works. It is in the applicant's and adjoining owner's interest for it to be as detailed as possible.

Reason: Management of records.

70. Prior to the commencement of any excavation works on site the applicant must submit, for approval by the Principal Certifying Authority (PCA), a geotechnical/civil engineering report which addresses (but is not limited to) the following:

(a) The type and extent of substrata formations. A minimum of 4 representative bore hole logs which are to provide a full description of all material from the ground surface to a minimum of 1.0m below the finished basement floor level. The report is to include the location and description of any anomalies encountered in the profile, and the surface and depth of the bore hole logs shall be to Australian Height Datum.

(b) Having regard to the findings of the bore hole testing, details of the appropriate method of excavation/shoring together with the proximity to adjacent property and structures can be ascertained. As a result potential vibration caused by the method

of excavation and how it will impact on nearby footings/foundations must be established together with methods to ameliorate any impact.

(c) The proposed methods for temporary and permanent support required by the extent of excavation can be established.

(d) The impact on groundwater levels in relation to the basement structure.

(e) The drawdown effects if any on adjacent properties (including the road reserve), resulting from the basement excavation will have on groundwater together with the appropriate construction methods to be utilised in controlling groundwater.

Where it is considered there is potential for the excavation to create a "dam" for natural groundwater flows, a groundwater drainage system must be designed to transfer groundwater through or under the proposed development. This design is to ensure there is no change in the range of the natural groundwater level fluctuations. Where an impediment to the natural flow path of groundwater results, artificial drains such as perimeter drains and through drainage may be utilised.

(f) The recommendations resulting from the investigations are to demonstrate the works can be satisfactorily implemented. An implementation program is to be prepared along with a suitable monitoring program (where required) including control levels for vibration, shoring support, ground level and groundwater level movements during construction.

The implementation program is to nominate suitable hold points for the various stages of the works in order verify the design intent before certification can be issued and before proceeding with subsequent stages.

The geotechnical report must be prepared by a suitably qualified consulting geotechnical/hydrogeological engineer with demonstrated experience in such investigations and reporting. It is the responsibility of the engaged geotechnical specialist to undertake the appropriate investigations, reporting and specialist recommendations to ensure a reasonable level of protection to adjacent properties and structures both during and after construction. The report must contain site specific geotechnical recommendations and must specify the necessary hold/inspection points by relevant professionals as appropriate. The design principles for the geotechnical report are as follows:

(i) No ground settlement or movement is to be induced which is sufficient enough to cause an adverse impact to adjoining property and/or infrastructure.

(ii) No changes to the ground water level are to occur as a result of the development that is sufficient enough to cause an adverse impact to the surrounding property and infrastructure.

(iii) No changes to the ground water level are to occur during the construction of the development that is sufficient enough to cause an adverse impact to the surrounding property and infrastructure.

(iv) Vibration is to be minimised or eliminated to ensure no adverse impact on the surrounding property and infrastructure occurs, as a result of the construction of the development.

(v) Appropriate support and retention systems are to be recommended and suitable designs prepared to allow the proposed development to comply with these design principles.

(vi) An adverse impact can be assumed to be crack damage which would be classified as Category 2 or greater damage according to the classification given in Table CI of AS 2870 - 1996.

Reason: To ensure the ongoing safety and protection of property.

71. Details of the proposed connection to the existing open channel shall be submitted to and approved by Council's Catchment Management Unit approval prior to commencement of any work.

Reason: To ensure adequate stormwater infrastructure is provided.

72. Erosion and sediment control measures are to be installed in accordance with the publication 'Urban Stormwater: Soils and Construction "The Blue Book" 2004 (4th edition) prior to the commencement of any demolition, excavation or construction works upon the site. These measures are to be maintained throughout the entire works.

Reason: To ensure soil and water management controls are in place before site works commence.

73. Prior to commencement of works and during construction works, the development site and any road verge immediately in front of the site must be maintained in a safe and tidy manner. In this regard the following must be undertaken:

(a) all existing buildings are to be secured and maintained to prevent unauthorised access and vandalism
(b) all site boundaries are to be secured and maintained to prevent unauthorised access to the site;
(c) all general refuge and/or litter (inclusive of any uncollected mail/advertising material) is to be removed from the site on a fortnightly basis;
(d) the site is to be maintained clear of weeds; and
(e) all grassed areas are to be mowed on a monthly basis.

Reason: To ensure public safety and maintenance of the amenity of the surrounding environment.

74. All works associated with the construction and/or extension of a driveway crossover/layback within Council owned land requires an application to be lodged and approved by Council.

All footpath crossings, laybacks and driveways are to be constructed according to Council's Specification for Construction or Reconstruction of Standard Footpath Crossings and in compliance with Standard Drawings DS1 (Kerbs & Laybacks); DS7 (Standard Passenger Car Clearance Profile); DS8 (Standard Vehicular Crossing); DS9 (Heavy Duty Vehicular Crossing) and DS10 (Vehicular Crossing Profiles).

The application for a driveway crossing requires the completion of the relevant application form and accompanied by plans, grades/levels and specifications. A fee in accordance with Councils adopted 'Fees and Charges' will need to be paid at the time of lodgement.

Note 1: This development consent is for works wholly within the property. Development consent does not imply approval of the footpath or driveway levels, materials or location within the road reserve, regardless of whether the information is shown on the development application plans.

Note 2: Council's Customer Service Team can advise of the current fee and can be contacted on 9806 5524

Reason: To provide suitable vehicular access without disruption to pedestrian and vehicular traffic.

75. A Construction Environmental Management System and Plan (CEMP) shall be submitted to, and approved by, Council's DTSU Manager prior to work.

The CEMP must be prepared in accordance with ISO14001:2015 and the Department of Infrastructure, Planning and Natural Resources (2004) 'Guidelines for the Preparation of Environmental Management Plans' and submitted to the relevant authorities at least 4 weeks prior to the commencement of construction.

This plan should cover demolition, soil and water management and site maintenance and any associated groundwater, flooding and overland stormwater flow management. It must address any possible pollution risks, and how they will be managed. It must incorporate updated erosion and sediment control plans/ stormwater plan showing how rainwater and groundwater captured within the site will be treated to satisfactory water quality standards, monitored and discharged. The plan and management system must be implemented throughout the work.
Reason: Environment protection.

76. If development involves excavation that extends below the level of the base, of the footings of a building on adjoining land, the person having the benefit of the development consent must, at the persons own expense:
(a) Protect and support the adjoining premises from possible damage from the excavation
(b) Where necessary, underpin the adjoining premises to prevent any such damage.

Note: If the person with the benefit of the development consent owns the adjoining land or the owner of the adjoining land has given consent in writing to the condition not applying, this condition does not apply.
Reason: As prescribed under the Environmental Planning and Assessment Regulation 2000.

77. Unless otherwise specifically approved in writing by Council, all works, processes, storage of materials, loading and unloading associated with the development are to occur entirely within the property boundaries. The applicant, owner or builder must apply for specific permits if the following activities are required seeking approval pursuant to Section 138 of the Roads Act 1993:
(a) On-street mobile plant:
E.g. Cranes, concrete pumps, cherry-pickers, etc. - restrictions apply to the hours of operation and the area where the operation will occur, etc. Separate permits are required for each occasion and each piece of equipment. It is the applicant's, owner's and builder's responsibilities to take whatever steps are necessary to ensure the use of any equipment does not violate adjoining property owner's rights.
(b) Storage of building materials and building waste containers (skips) on Council's property.
(c) Permits to utilise Council property for the storage of building materials and building waste containers (skips) are required for each location they are to be stored. Failure to obtain the relevant permits will result in the building materials

or building waste containers (skips) being impounded. Storage of building materials and waste containers within Council's open space areas, reserves and parks is prohibited.

(d) Kerbside restrictions - construction zones:
The applicant's attention is drawn to the possible existing kerbside restrictions adjacent to the development. Should the applicant require alteration of existing kerbside restrictions, or the provision of a work zones, the appropriate application must be made to Council and the fee paid. Applicants should note that the alternatives of such restrictions may require referral to Council's Traffic Committee. An earlier application is suggested to avoid delays in construction programs.

The application is to be lodged with Council's Customer Service Centre.

Reason: Proper management of public land.

78. Before any work the Principal Certifying Authority is to confirm the ground floor slab levels, including finishes, will be flush with the existing and/or proposed public domain as per the approved Public Domain Alignment Drawings;

With any s4.55 basement level modification (if applicable), provide survey data demonstrating level change is not required at the building/public domain interface as per the approved updated Alignment Drawings. Details of compliance shall be submitted to the Group Manager DTSU before works commence.

All the public domain works shall be constructed by licensed contractors. All the soft landscape works shall be carried out by licensed landscape contractors.

A pre-work site meeting is required with the Council's Road Asset Planning Team before the start of any works on site to confirm the works as per the approved CC drawing set and to discuss any critical issues that may arise.

A range of inspections will be carried out by Council staff during the construction phase. The applicant must contact the **Council's Inspection Officer** for each inspection listed below. At least **48-hour** notice must be given for all inspections, except tree inspections which require a 7 days' notice.

The required inspections include the following:

- Commencement of public domain works including tree protection measures installed and set out of tree pits.
- Formwork inspection for all footpaths and footpath crossing call 9806 5438 minimum of 48 hours in advance of the required inspection.
- Commencement of the works including survey marks, sub-grade preparation, and set out of curb alignments.
- Practical completion - defects inspection following completion of all public domain works has been completed to view paving, tactile surface indicators, service lids, nature strip/vegetation, and location of fixtures and fittings.

Note: Additional daily inspections by Council Officers may occur to view progressive paving set out and construction depending on the project size and type.

During the construction of all public area civil and drainage works, a qualified civil engineer must supervise the work to ensure it is completed by the Council's construction standards. The civil engineer is to provide certification of the above before achieving the Occupation Certificate.

79. The preparation of an appropriate hazard management strategy by an appropriately licensed asbestos consultant pertaining to the removal of contaminated soil, encapsulation or enclosure of any asbestos material is required. This strategy shall ensure that any such proposed demolition works involving asbestos are carried out in accordance with the requirements of the 'Code of Practice: How to Safely Remove Asbestos' published by Safework NSW. The strategy shall be submitted to the Principal Certifying Authority, prior to the commencement of any works. The report shall confirm that the asbestos material has been removed or is appropriately encapsulated and that the site is rendered suitable for the development.
Reason: To ensure risks associated with the demolition have been identified and addressed prior to demolition work commencing.

80. An updated Waste Management Plan is to be submitted immediately after the letting of all contracts detailing the:
(a) expected volumes and types of waste to be generated during the demolition and construction stages of the development;
(b) destination of each type of waste, including the name, address and contact number for each receiving facility.
The Waste Management Plan is to be submitted to the satisfaction of the Principal Certifying Authority prior to commencement of any works on site.
Reason: To ensure waste is managed and disposed of properly.

PART D – WHILE BUILDING WORK IS BEING CARRED OUT

81. All building work must be carried out in accordance with the current provisions of the Building Code of Australia (National Construction Code).
Reason: To comply with the Environmental Planning & Assessment Act 1979, as amended and the Environmental Planning & Assessment Regulation 2000

82. A copy of this development consent together with the stamped plans, referenced documents and associated specifications is to be held on-site during the course of any works to be referred to by all contractors to ensure compliance with the approval and the associated conditions of consent.
Reason: To ensure compliance with this consent.

83. Dust control measures shall be implemented during all periods of earth works, demolition, excavation and construction to minimise the dust nuisance on surrounding properties. In this regard, dust minimisation practices must be carried out in accordance with Section 126 of the Protection of the Environment Operations Act 1997.
Reason: To protect the amenity of the area.

84. No building materials skip bins, concrete pumps, cranes, machinery, temporary traffic control, signs or vehicles associated with the construction, excavation or demolition shall

be stored or placed on/in Council's footpath, nature strip, roadway, park or reserve without the prior approval being issued by Council under section 138 of the Roads Act 1993.
Reason: To ensure pedestrian access.

85. The principal certifier must ensure that building work, demolition or vegetation removal is only carried out between:
- 7am to 5pm on Monday to Friday
- 7am to 5pm on Saturday

The principal certifier must ensure building work, demolition or vegetation removal is not carried out on Sundays and public holidays, except where there is an emergency.

Unless otherwise approved within a construction site management plan, construction vehicles, machinery, goods or materials must not be delivered to the site outside the approved hours of site works.

Note: Any variation to the hours of work requires Council's approval.

Council may permit an extension to the approved hours of work in extenuating or unforeseen circumstances subject to an application and approval by City of Parramatta Council (CoPC) in accordance with the 'After Hours Works for Approved Development Applications Policy' (Policy).

A copy of this Policy and associated application form is available on the CoPC website. A fee will apply to any application made in accordance with this Policy.

The matters of consideration of any extension sought would include, but not be limited to the following aspects and should be detailed in any application made:
- Nature of work to be conducted;
- Reason for after-hours completion;
- Residual effect of work (noise, traffic, parking);
- Demographic of area (residential, industrial);
- Compliance history of subject premises;
- Current hours of operation;
- Mitigating o extenuating circumstance; and
- Impact of works not being completed.

Reason: To protect the amenity of the surrounding area.

86. The applicant must record details of all complaints received during the construction period in an up to date complaints register. The register must record, but not necessarily be limited to:
(a) The date and time of the complaint;
(b) The means by which the complaint was made;
(c) Any personal details of the complainants that were provided, or if no details were provided, a note to that affect;
(d) Nature of the complaints;
(e) Any action(s) taken by the applicant in relation to the complaint, including any follow up contact with the complaint; and
(f) If no action was taken by the applicant in relation to the complaint, the reason(s) why no action was taken.

The complaints register must be made available to Council and/or the Principal Certifying Authority upon request.
Reason: To allow the Principal Certifying Authority/Council to respond to concerns raised by the public.

87. While building work is being carried out, and where a noise and vibration management plan is approved under this consent, the applicant must ensure that any noise generated from the site is controlled in accordance with the requirements of that plan.
OR
While building work is being carried out and where no noise and vibration management plan is approved under this consent, the applicant is to ensure that any noise caused by demolition, vegetation removal or construction does not exceed an LAeq (15 min) of 5dB(A) above background noise, when measured at any lot boundary of the property where the construction is being carried out.
Reason: To protect the amenity of the neighbourhood.

88. While building work is being carried out, a registered surveyor is to measure and mark the positions of the following and provide them to the principal certifier: -
(a) All footings/ foundations
(b) At other stages of construction – any marks that are required by the principal certifier
Reason: To ensure buildings are sited and positioned in the approved location.

89. Occupation of any part of the footpath or road at or above (carrying out work, storage of building materials and the like) during construction of the development shall require a Road Occupancy Permit from Council. The applicant is to be required to submit an application for a Road Occupancy Permit through Council's Traffic and Transport Services, prior to carrying out the construction/restoration works.
Reason: To ensure proper management of Council assets.

90. Oversize vehicles using local roads require approval from the National Heavy Vehicle Regulator (NHVR). The applicant is required to submit an application for an Oversize Vehicle Access Permit through NHVR's portal (www.nhvr.gov.au/about-us/nhvr-portal) prior to driving through local roads within the City of Parramatta LGA.
Reason: To ensure maintenance of Council's assets.

91. No materials (including waste and soil), equipment or goods of any type are to be stored, kept or placed within 5m of the trunk of a tree or within the Tree Protection Zone (TPZ) of any tree. All activities involving soil level changes, excavation, cleaning, and refuelling are prohibited within the TPZ. Some activities may be authorised if required but must be approved in writing prior by the Project Arborist. Any additional mulching or irrigation required should be done at the discretion of the Project Arborist. Any agreed works must be written up as a report summary by the Project Arborist and submitted to the Certifying Authority.
Reason: To ensure the protection of the trees to be retained on the site.

92. All excavation within the TPZ of trees numbered 7, 8, 16, 21, 43, 50, and 52 to 78 located adjacent to the site as numbered within ht eArboricultural Impact Assessment report by Urban Arbor 230413_150-152 Briend_AIA_R6 dated 13.04.23, is to be supervised by an Australian Qualifications Framework (AQF) Level 5 Project arborist. If during excavation the Arborist identifies remedial work is necessary, it is to be supervised by this Arborist.

Once the work is completed a written report detailing the remedial work undertaken is to be forwarded to the Principal Certifying Authority.
Reason: To provided adequate protection of trees.

93. Trees to be removed are:

Tree No.	Species	Common Name	Location
6	*Casuarina glauca*	Swamp Oak	Northern side boundary

Note: trees 1, 2, 3, 4, 5, 10, 11, 12, 13, 14 (total 11) have already been approved for removal under DA/738/2019.
Reason: To facilitate development.

94. All trees/shrubs planted within the site must be of an adequate root volume and maturity so as not to require staking or mechanical support unless in a wind-prone area. Planting must be carried out in accordance with the approved Landscape Plan and conditions of consent.
Reason: To ensure the trees/shrubs planted within the site are able to reach their required potential.

95. All approved tree removal must be supervised by an Australian Qualification Framework (AQF) Level 3 Arborist and undertaken in accordance with the Code of Practice for Amenity Tree Industry 1998.
Reason: To ensure tree works are carried out safely.

96. All machinery is to be cleaned of soil and debris before entering the site to prevent the spread of weed and fungal pathogens such as Cinnamon Fungus (Phytophthora cinnamomi) and Chytrid Fungus (Batrachochytrium dendrobatidis).
Reason: To ensure protection of bushland and minimise the impacts of the development.

97. The proponent shall prepare an unexpected finds procedure for asbestos management that shall be implemented during the excavation of the trench into Council's Reserve. Should construction of an easement into a Council Reserve uncover asbestos containing material, all works in the vicinity are to cease immediately and the affected area shall be barricaded off to provide an exclusion zone. Council shall be notified and a NSW Safework licenced asbestos removalist must be engaged to handle, transport and dispose of the asbestos containing material to an EPA licensed landfill. An accredited Safe Work NSW Licenced Asbestos Assessor (Occupational hygienist) shall be engaged to supervise, validate and issue a clearance certificate for the removal of asbestos contaminated materials from the work site. All asbestos containing material removal shall be undertaken in accordance with Code of Practice How to Safely Remove Asbestos (SafeWork NSW December 2022) and Code of Practice How to Manage and Control Asbestos in the Workplace (SafeWork NSW December 2022). A clearance certificate and all waste dockets for the removal of asbestos containing material shall be forwarded to the principal certifying authority and Council before issue of the occupation certificate.

The 1800 Asbestos Hotline (1800 272 378) has been established to provide free advice and guidance on asbestos-related issues and is a central point of contact for all asbestos enquiries in NSW.
Reason: To ensure protection of workers and restoration of Council land.

98. Any excavation works to install the easement/stormwater infrastructure within the Tree Protection Zone (AS 4970:2009) of trees within the public reserve are to be undertaken by hand or other approved methodology under the supervision of the Project Arborist (AQF level 5). No roots greater than 30mm diameter are to be severed without prior approval from the Project Arborist. Any smaller roots that are required to be severed are to be cleanly cut using a sterilised hand saw or secateurs.
Reason: To ensure protection of trees and minimise the impacts of the development.

99. Works are not to result in sedimentation and or run-off from the approved works onto the adjoining properties and or public lands. The person having the benefit of this consent must ensure sediment is not tracked out from the development site.
Reason: To ensure no adverse impacts on neighbouring properties.

100. Any damage to Council assets that impacts on public safety during construction is to be rectified immediately to the satisfaction of Council with all costs to be borne by the person having the benefit of the Development Consent.
Reason: To protect public safety.

101. In the event that material is identified at the subject site as contaminated as defined in the Managing Land Contamination Planning Guidelines dated 1998 and prepared by the Department of Urban Affairs and Planning, the soil must be tested by a person with suitable expertise, to ensure the soil contaminant levels are below acceptable health criteria for residential areas. Any soil investigation must be carried out in accordance with the NSW Environment Protection Authority's Guidelines for Consultants Reporting on Contaminated Sites, the NSW Department of Environment and Conservation Guidelines for the Assessment and Management of Groundwater Contamination 2007, and the provisions of the Contaminated Land Management Act 1997 and Regulation 2013.
Reason: To ensure that the provisions set out in Clause 4.6 of State Environmental Planning Policy (Resilience and Hazards) 2021 have been met and the use of the land poses no risk to the environment and human health.

102. No vehicle access is permitted from the premises into the adjoining bushland reserve.
Reason: To ensure protection of the bushland reserve and manage the impacts of the development.

103. The applicant must not enter or undertake any work within any adjoining public parks or reserves without the prior written consent of Council.
Reason: Protection of existing public infrastructure and land and to ensure public safety and proper management of public land.

104. While building work is being carried out, the principal certifier must be satisfied all soil removed from or imported to the site is managed in accordance with the following requirements:
(a) All excavated material removed from the site must be classified in accordance with the EPA's Waste Classification Guidelines before it is disposed of at an approved waste management facility and the classification, and the volume of material removed must be reported to the principal certifier.
(b) All fill material imported to the site must be Virgin Excavated Natural Material as defined in Schedule 1 of the Protection of the Environment Operations Act 1997 or

a material identified as being subject to a resource recovery exemption by the NSW EPA

Reason: To ensure soil removed from the site is appropriately disposed of and soil imported to the site is safe for future occupants.

105. Hazardous or intractable wastes arising from the demolition process shall be removed and disposed of in accordance with the requirements of SafeWork NSW and the EPA, and with the provisions of:
(a) Work Health and Safety Act 2011
(b) NSW Protection Of the Environment Operations Act 1997 (NSW) and
(c) NSW Department of Environment and Climate Change Environmental Guidelines; NSW EPA Waste Classification Guidelines

Reason: To ensure that the land is suitable for the proposed development and any contaminating material required to be removed from the property is removed in accordance with the prescribed manner.

106. Liquid and solid wastes generated on site shall be collected, transported and disposed of in accordance with the Protection of the Environment Operations (Waste) Regulation 2014 and in accordance with the Environment Protection Authority's Waste Tracking Guidelines as described in the Environmental Guidelines Assessment, Classification and Management of Liquid and Non-Liquid Wastes (1999). NSW EPA Waste Classification Guidelines
Reason: To prevent pollution of the environment.

107. Any contamination material to be removed from the site shall be disposed of to an EPA licensed landfill.
Reason: To comply with the statutory requirements of the Protection of the Environment Operations Act 1997

108. Site water discharged must not exceed suspended solid concentrations of 50 parts per million, and must be analysed for pH and any contaminants of concern identified during the preliminary or detailed site investigation, prior to discharge to the stormwater system. The analytical results must comply with relevant Environmental Protection Authority and Australian & New Zealand Guidelines for Fresh & Marine Water Quality Other options for the disposal of excavation pump-out water include disposal to sewer with prior approval from Sydney Water, or off-site disposal by a liquid waste transporter for treatment/disposal to an appropriate waste treatment/processing facility.
Reason: To prevent pollution of waterways.

109. Any site excavation areas must be kept free of accumulated water at all times. Water that accumulates within an excavation must be removed and disposed of in a manner that does not result in: the pollution of waters, nuisance to neighbouring properties, or damage/potential damage to neighbouring land and/or property. A de-watering plan is required to be included and submitted to Council for review prior to issue of a Construction Certificate.
Reason: To protect against subsidence, erosion and other nuisances.

110. A footpath is to be constructed in accordance with Council Standard Drawing DS3 in front of the site within the road reserve. Details of the proposed footpath works shall be submitted to and approved by Council's Civil Asset Team prior to commencement of footpath works. All costs are to be borne by the applicant.

Reason: To provide pedestrian passage.

111. A Standard Kerb Ramp is to be constructed at Briens Road in accordance with Council Plan No. DS4. Details must be submitted to and be approved by Council prior to construction. All costs must be borne by the applicant.
Reason: To provide adequate access.

112. Car parking area and internal accessways must be constructed, marked and signposted in accordance with AS2890.1 –2004 'Off Street Car Parking Facilities' prior to an Occupation Certificate being issued.
Reason: To ensure appropriate car parking.

113. Appropriate signage must be erected at the vehicle egress points to compel all vehicles to stop before proceeding onto the public way.
Reason: To ensure pedestrian safety.

114. During construction of all public area civil and drainage works a qualified civil engineer must supervise the work to ensure it is completed in accordance with Council's "Guidelines for Public Domain Works". Certification is required to be provided with the Occupation Certificate.
Reason: To ensure Council's assets are appropriately constructed.

115. Trees to be removed to facilitate the stormwater easement are:

Tree No.	Species	Common Name	Location
7	*Corymbia citriodora*	Lemon scented gum	Refer to Arborist report prepared by Urban Arbor dated 22 February 2024, revision 7.
43	*Corymbia citriodora*	Lemon scented gum	

Reason: To facilitate the development.

116. Any fill material imported to the site is to be virgin excavated natural material (VENM) and is to be certified as such by a suitably qualified industry professional. Records of each individual certification are to be kept on site and produced for inspection when requested.
Reason: To ensure the site does not become contaminated and appropriate compaction levels can be achieved.

117. A Waste Data file is to be maintained, recording building/demolition contractor's details and waste disposal receipts/dockets for any demolition or construction wastes from the site. These records must be retained and made available to Council on request.
Reason: To confirm waste minimisation objectives under Parramatta Development Control Plan 2011 are met.

PART E – BEFORE THE ISSUE OF AN OCCUPATION CERTIFICATE

118. Occupation or use of the building or part is not permitted until an Occupation Certificate has been issued in accordance with Section 6.9 of the Environmental Planning and Assessment Act 1979.
Reason: To comply with legislative requirements of the Environmental Planning and Assessment Act 1979.

119. In accordance with Clause 162B of the Environmental Planning and Assessment Regulation 2000, the Principal Certifying Authority responsible for the critical stage inspections must make a record of each inspection as soon as practicable after it has been carried out. The record must include:
    (a) The development application and Construction Certificate number as registered;
    (b) The address of the property at which the inspection was carried out;
    (c) The type of inspection;
    (d) The date on which it was carried out;
    (e) The name and accreditation number of the certifying authority by whom the inspection was carried out; and
    (f) Whether or not the inspection was satisfactory in the opinion of the certifying authority who carried it out.

    Reason: To comply with statutory requirements.

120. A qualified Landscape Architect/Designer must certify that the completed works are in accordance with the approved landscape plan. All landscape works must be completed prior to the issue of an Occupation Certificate.

    Reason: To ensure restoration of environmental amenity.

121. Public reserve areas disturbed during easement excavation works must be rehabilitated through revegetation with indigenous plant species, such as *Lomandra longifolia, Juncus usitatus, Ficinia nodosa* and *Carex appressa*, and mulching to the satisfaction of Council's Natural Resources Manager or delegate.
    Reason: To ensure adequate restoration of Council land.

122. Prior to issue of an Occupation Certificate, the applicant is to submit documentation to the satisfaction of Council's Manager of Natural Areas or delegate demonstrating that the stormwater outlet has been constructed in accordance with Council's 'Stormwater Outlet Natural Waterway Standard Detail' and consent conditions.
    Reason: To ensure adequate standards of construction and minimise the impacts on riparian vegetation and waterways.

123. Works-As-Executed stormwater plans are to address the following:
    (a) A WAE survey shall be conducted and plans prepared showing the 'as built' of the complete on-site detention system including (but not restricted to) discharge point, storage tank (including all critical elements), all pipes and pits connected to the OSD system, overland flow swale and surface levels that control surface flows to the OSD system and by design bypassing the OSD system.
    (b) The survey shall confirm a) that all retaining walls including foundations are wholly within the site boundary, b) that the swales have been constructed as per the approved plans, c) that the relevant boundary fences have been raised to allow overland flow to drain unobstructed though to the swale.
    (c) The Work-As-Executed plans are prepared on the copies of the approved drainage plans issued with the Construction Certificate with the variations marked in red ink.
    (d) The Work-As-Executed plans have been prepared by a registered surveyor certifying the accuracy of dimensions, levels, storage volumes, etc.
    (e) The as built On-Site Detention (OSD) storage volumes are to be presented in a tabular form (depth verses volume table
    (f) OSD Works-As-Executed dimensions form (refer to UPRCT Handbook).

(g) Certificate of Hydraulic Compliance from a qualified drainage / hydraulic engineer (refer to UPRCT Handbook). The certificate must only be provided after conducting a satisfactory final inspection. The final inspection shall include the application of all the ancillary components of the system including but not limited to: step-irons, orifice plate, trash screen with appropriate wall attachment, hinged grates, confined space sign, functioning return lap valve and relief drains within DCP sump etc.

(h) Certificate of Structural compliance of the OSD tank shall reference the structural elements including floor slab/foundations, walls and cover slab from a qualified structural engineer

(i) The WAE plan shall include the full length of the downstream drainage easement and the trunk drainage system.

(j) Photographic evidence of the connection point to the existing pit.

(k) Details WAE plan of the flood risk management implementation for the development, to show compliance with the approved flood risk management report.

The above is to be submitted to the Principal Certifying Authority prior to the issue of an occupation certificate and a copy is to accompany the Occupation Certificate when lodged with Council.

Reason: To ensure works comply with approved plans and adequate information is available for Council to update the Upper Parramatta River Catchment Trust.

124. Prior to the issue of the Occupation Certificate, the applicant must create a restriction on use and positive covenant on the title of the subject property.

- The restriction on use and positive covenant is to be created over all land below the 1% AEP flood level identified in the flood enquiry, FL/49/2019, dated 29 May 2019, issued by City of Parramatta Council and Flood report prepared by J.Wyndham Prince, issue A, dated 31/07/2023.
- Preventing the placement of any structures, walls, fences, fill or other items which may impede the % AEP flood, within the identified zone and prevent interference with and create an ongoing obligation for the maintenance of any flood risk mitigation measures.
- City of Parramatta Council is to be the Authority whose consent is required to release, vary or modify the restriction.

Reason: To protect the environment.

125. Prior to the issue of an Occupation Certificate a Positive Covenant and Restriction on the Use of Land under Section 88E of the Conveyancing Act 1919 must be created, burdening the owner with the requirement to maintain the on-site stormwater detention (OSD) and water quality treatment (WSUD) facilities on the lot.

The terms of the 88E Instruments are to be generally in accordance with Council's "standard terms" available in Council's website, under Development Forms.

Where a Title exists, the Positive Covenant and Restriction on the Use of Land is to be created through via an application to the Land Titles Office using forms 13PC and 13RPA. Accompanying this form is the requirement for a plan to scale showing the relative location of the On-Site Detention facility, including its relationship to the building footprint.

Registered title documents showing the covenants and restrictions must be submitted to and approved by the Principal Certifying Authority prior to Occupation or use of on-site.

Electronic colour photographs in jpg format of the on-site detention facility shall accompany the application for the Positive Covenant and the Restriction on the Use of the Land. These photos shall include such elements as the orifice plate, trash screen, step irons, weir, sump and bench on the floor of the DCP, return pipe and flap valve, wide angle view of the storage area or multiple photos, grates closed from above, grates open showing the edges to the opening and under frame packing with mortar or concrete, all pipe entries to the DCP and confined space warning signs at each entry point. The photos must be well labelled and must differentiate between multiple tanks. Additional photos may be requested if required.

Reason: To ensure maintenance of on-site detention facilities

126. An evacuation report and procedure shall be prepared by an appropriate consulting engineer. This report is to demonstrate how the occupants of the development will egress the site in the early stages of a storm event, together with how they will seek refuge in a peak stormwater event (i.e. first floor of the building etc.). The report shall be submitted to the Principal Certifying Authority prior to the issue of the Occupation Certificate. A copy of the report shall be attached to the Occupation Certificate when forwarded to Council.

Reason: To make property owners/residents aware of the procedure in the case of flood.

127. Prior to the issue of any Occupation Certificate, an application is required to be obtained from Council for any new, reconstructed or extended sections of driveway crossings between the property boundary and road alignment.

All footpath crossings, laybacks and driveways are to be constructed according to Council's Specification for Construction or Reconstruction of Standard Footpath Crossings and in compliance with Standard Drawings DS1 (Kerbs & Laybacks); DS7 (Standard Passenger Car Clearance Profile); DS8 (Standard Vehicular Crossing); DS9 (Heavy Duty Vehicular Crossing) and DS10 (Vehicular Crossing Profiles).

The application for a driveway crossing requires the completion of the relevant application form and be accompanied by detailed plans showing, grades/levels and specifications that demonstrate compliance with Council's standards, without conflict with all internal finished surface levels. The detailed plan must be submitted to Council's Civil Assets Team for approval prior to commencement of the driveway crossing works. A fee in accordance with Councils adopted 'Fees and Charges' will need to be paid at the time of lodgement.

Note 1: This development consent is for works wholly within the property. Development consent does not imply approval of the footpath or driveway levels, materials or location within the road reserve, regardless of whether the information is shown on the development application plans.

Note 2: Council's Customer Service Team can advise of the current fee and can be contacted on 9806 5524.

Reason: Pedestrian and Vehicle safety.

128. All redundant lay-backs and vehicular crossings must be reinstated to conventional kerb and gutter, foot-paving or grassed verge in accordance with Council's Standard Plan No. DS1. The reinstatement must be completed prior to the issue of an Occupation Certificate. All costs must be borne by the applicant.
Reason: To provide satisfactory drainage.

129. Prior to the issue of an Occupation Certificate a Positive Covenant on the Use of Land under Section 88E of the Conveyancing Act 1919 must be created, burdening the owner with the requirement to maintain the pump out system on the lot.

The terms of the 88E Instruments are to be generally in accordance with Council's "standard terms" available in Council's website, under Development Forms.

Where a Title exists, the Positive Covenant and Restriction on the Use of Land is to be created through via an application to the Land Titles Office using forms 13PC. Accompanying this form is the requirement for a plan to scale showing the relative location of the pump out system, including its relationship to the building footprint.

Registered title documents showing the covenant must be submitted to and approved by the Principal Certifying Authority prior to Occupation or use of site.
Reason: To ensure compliance

130. Prior to the issue of the Occupation Certificate, the applicant must create a restriction on use on the title of the subject property and form part of the strata that no valuables are to be stored on the basement level.

Where a Restriction on the Use of Land is to be created through via an application to the Land Titles Office using forms 13RPA. Accompanying this form is the requirement for a plan to scale showing the location of the basement level.

Registered title documents showing the covenant must be submitted to and approved by the Principal Certifying Authority prior to Occupation or use of site.
Reason: To ensure compliance

131. In accordance with Clause 63 of the Environmental Planning and Assessment (Development Certification and Fire Safety) Regulation 2021, the Principal Certifying Authority responsible for the critical stage inspections must make a record of each inspection as soon as practicable after it has been carried out.
The record must include:
(a) The development application and Construction Certificate number as registered;
(b) The address of the property at which the inspection was carried out;
(c) The type of inspection;
(d) The date on which it was carried out;
(e) The name and accreditation number of the certifying authority by whom the inspection was carried out; and
(f) Whether or not the inspection was satisfactory in the opinion of the certifying authority who carried it out.
Reason: To comply with statutory requirements.

132. Prior to issue of the occupation certificate, the applicant shall enter into a commercial contract for the collection of trade wastes and recyclable materials arising from business operations on site. A copy of all-waste contracts and receipts shall be kept on site and made available to Council officers on request.
Reason: To comply with the Requirements of the Protection of the Environment Operations Act 1997 and Regulations.

133. Prior to the issue of an occupation certificate (Interim or Final) written certification from a suitably qualified person(s) shall be submitted to the Principal Certifying Authority and City of Parramatta Council, stating that all works/methods/procedures/control measures approved by Council in the Acoustic Report referenced in Condition 1 of this consent.
Reason: To demonstrate compliance with submitted reports.

134. Proof of completion of the Kerb Ramp must be submitted to the satisfaction of the Council prior to the issue of an Occupation Certificate.
Reason: To provide adequate access.

135. Prior to the issue of the Occupation Certificate, the applicant must create a restriction on use on the title of the subject property and form part of the strata that no valuable items are to be stored on the basement level or below the PMF level (19.2m AHD).

Where a Restriction on the Use of Land is to be created via an application to the Land Titles Office using forms 13RPA, accompanying this form is the requirement for a plan to scale showing the location of the basement level.

Registered title documents showing the covenant must be submitted to and approved by the Principal Certifying Authority prior to Occupation or use of the site.
Reason: To ensure compliance

136. The applicant shall meet the full cost of the replacement of the removed two lemon scented gum trees (Tree 7 & 43). Four *Eucalyptus tereticornis* (minimum 45 litre pot) replacement trees are to be planted. They are to be planted near the subject site's southern boundary on Council land. Soil conditioning works are to be undertaken prior to planting to ensure suitable growing conditions and to promote good health during the establishment period and into maturity. The tree shall be maintained in a healthy and vigorous state for a period of 12 months from the date of planting or until established. Maintenance includes, but is not limited to, watering, weeding, removal of rubbish from tree base, pruning, fertilising, pest and disease control and any other operations to maintain a healthy robust tree. If the replacement trees are found to be faulty, damaged, dying or dead within twelve (12) months of planting then they must be replaced with the same species. Documentation of the purchase and planting must be submitted to Council or the nominated private certifier.
Reason: To maintain local tree canopy cover and environmental amenity.

137. Before **any issue** of the Occupation Certificate (including a Preliminary OC), the works outlined in the approved Public Domain Construction Drawings must be completed to the Council's satisfaction and final defects rectified, with a **final approval** obtained from Council's Road Asset Planning, Catchment Management & Environment Manager.

Any defects raised by Council officers during the above construction and defects period inspections will be notified in writing. Defects may include incorrect location of elements,

unsatisfactory construction techniques or finishes, or any other non-compliance with the approved plans, longitudinal sections and specifications, or the public domain guidelines.

All defects raised by Council officers during the construction period and at the final inspection need to be rectified before and signed off at the final defects' inspection by Council officers to achieve Occupation Certification.

A 52-week defects period will commence with the issue of an Occupation Certificate.
Further signoff of defects will again be needed before the final handover.
The Certificate of Completion shall not be issued until the Council's final approval is obtained.

The **Work-as-Executed Plans** shall be prepared and submitted to the Council showing the final-approved public domain works after the final approval and before any issue of the OC. The WAE drawings shall be submitted to the Council as both CAD and PDF drawings.

PART F – OCCUPATION AND ONGOING USE

138. No goods are to be stored/displayed outside the walls of the building.
Reason: To ensure visual amenity.

139. When Council receives an occupation certificate from the principal certifier, the applicant may lodge an application to release the securities held in accordance with the relevant policy.

Council may use part, or all of the securities held to complete the works to its satisfaction if the works do not meet Council's requirements.

Note: A written application to Council's Civil Assets Team is required for the release of a bond and must quote the following:
(a) Council's Development Application number; and
(b) Site address.
Note: Council's Civil Assets Team will take up to 21 days from receipt of the request to provide the written advice.
Reason: To allow release of securities and authorise Council to use the security deposit to complete works to its satisfaction.

140. The owner/manager of the site/business is responsible for the removal of all graffiti from the building/structures/signage and/or fencing within 48 hours of its application.
Reason: To ensure the removal of graffiti.

141. The days and hours of operation are restricted to:

Day	Time
Monday	9am to 9am (24 Hours)
Tuesday	9am to 9am (24 Hours)
Wednesday	9am to 9am (24 Hours)
Thursday	9am to 9am (24 Hours)
Friday	9am to 9am (24 Hours)

Saturday	9am to 9am (24 Hours)
Sunday	9am to 9am (24 Hours)
Public Holidays	N/A

Reason: To minimise the impact on the amenity of the area.

142. Roller shutters are not to be placed over any external door or window of the premises. Any security grill is to be located on the inside of the glass shop front and must be an open grille able to be seen through.
Reason: To provide an appropriate streetscape appearance.

143. Any external plant/air-conditioning system must not exceed a noise level of 5dBA above the background noise level when measured at the boundaries of the property.
Reason: To minimise noise impact of mechanical equipment.

144. The property owner/body corporate is to ensure the warning system is in good working order, through regular testing and maintenance.
Reason: To ensure the integrity of the flood warning system.

145. The signage and/or lighting associated with this consent are not permitted to be flashing and/or moving.
Reason: To maintain amenity for adjoining properties.

146. To reduce the risk of pollution to natural water courses all hazardous waste materials are to be stored, used and disposed in accordance with plans and approved documentation as referenced in Condition 1.
Reason: To ensure that any liquid spills can be contained on site and prevent the contamination of stormwater drains.

147. All waste storage areas are to be maintained in a clean and tidy condition at all times.
Reason: To ensure the ongoing management of waste storage areas.

148. Between collection periods, all waste/recyclable materials generated on site must be kept in enclosed bins with securely fitting lids so the contents are not able to leak or overflow. Bins must be stored in the designated waste/recycling storage room(s) or area(s) between collection periods.
Reason: To ensure waste is adequately stored within the premises.

149. Trade waste water shall be disposed of in accordance with the permit requirements of Sydney Water Corporation Ltd, Wastewater Source Control Branch.
Reason: To ensure compliance with Sydney Water's requirements and protect the environment.

150. The use of the premises not giving rise to:
(a) transmission of unacceptable vibration to any place of different occupancy,
(b) a sound pressure level measured at any point on the boundary of any affected residential premises that exceeds the background noise level by more than 5 dB(A). The source noise level shall be assessed as an LAeq,15 min and adjusted in accordance with Environment Protection Authority (EPA) guidelines for tonality, frequency weighting, impulsive characteristics, fluctuations, and temporal content as described in the NSW Environmental Planning & Assessment Act 1979: Noise

Policy for Industry 2017 and the Protection of the Environment Operations Act 1997.

Reason: To prevent loss of amenity to the area.

151. All landscape works shall be maintained for a minimum period of one (1) year following the issue of a Final Occupation Certificate, in accordance with the approved landscape plan and conditions.
Reason: To ensure restoration of environmental amenity.

152. A waste storage room is to be provided on the premises and shall be constructed to comply with all the relevant provisions of Council's Development Control Plan (DCP) 2011 including:
(a) The size being large enough to accommodate all waste generated on the premises, with allowances for the separation of waste types;
(b) The floor being graded and drained to an approved drainage outlet connected to the sewer and having a smooth, even surface, coved at all intersections with walls;
(c) The walls being cement rendered to a smooth, even surface and coved at all intersections;
(d) Cold water being provided in the room with the outlet located in a position so that it cannot be damaged and a hose fitted with a nozzle being connected to the outlet;
(e) The room shall be adequately ventilated (either natural or mechanical) in accordance with the Building Code of Australia and in accordance with AS1668
Reason: To ensure provision of adequate waste storage arrangements

Advisory Note

- The applicant is advised that the adjoining public reserve contains 'native vegetation' and/or is identified on the NSW Department of Planning and Environment (DPE) 'Biodiversity Values Map' (https://www.lmbc.nsw.gov.au/BVMap) under the *Biodiversity Conservation Act 2016*. This Act prohibits the clearing of native vegetation or prescribed impacts on 'Biodiversity Values Map' land without OEH approval, where such activities are not authorised by a development consent under the *Environmental Planning and Assessment Act 1979*. Actions such as tree removal, understorey slashing or mowing, or removal of dead trees is illegal clearing and could result in any person who carried out such an action as LIABLE FOR PROSECUTION.

Advisory Note

- The Persons carrying out excavation of land within Council reserves should exercise appropriate caution as asbestos or other contaminated materials may be present. In the event that asbestos or other contaminated materials are identified, Council is to be notified and the contaminated materials are to be managed safely and appropriately in accordance with SafeWork NSW Codes of Practice, the NSW *Work Health and Safety Act and Regulation 2017* and *Protection of the Environment Operations (Waste) Regulation 2014*.

City of Parramatta	
File No:	DA/19/2023

SECTION 4.15 ASSESSMENT REPORT
Environmental Planning & Assessment Act 1979

DA No:	DA/19/2023
Subject Property:	Lot 111 DP 1160038 150-152 Briens Road, NORTHMEAD NSW 2152
Proposal:	Construction and use of multi-unit industrial warehouse and ancillary offices, storage premises, carparking and signage. The application is Nominated Integrated Development under the Water Management Act 2000.
Date of receipt:	13 January 2022
Applicant:	Hannas Contracting Services Pty Ltd
Owner:	Briens River Pty Ltd
Property owned by a Council employee or Councillor:	The site is not known to be owned by a Council employee or Councillor
Political donations/gifts disclosed:	None disclosed on the application form
Submissions received:	None
Recommendation:	**Deferred Commencement approval subject to conditions**
Assessment Officer:	Denise Fernandez

Legislative Requirements

Relevant provisions considered under section 4.15(1)(a) of the Environmental Planning and Assessment Act 1979	• Water Management Act 2000 • Biodiversity Conservation Act 2016 • Protection of the Environment Operations Act 1997 • State Environmental Planning Policy (Resilience and Hazards) 2021 • State Environmental Planning Policy (Transport and Infrastructure) 2021 • State Environmental Planning Policy (Biodiversity and Conservation) 2021 • State Environmental Planning Policy (Industry and Employment) 2021 • Parramatta Local Environmental Plan 2011 • Parramatta Development Control Plan 2011
Zoning	IN1 General Industrial and SP2 Special Infrastructure
Bushfire Prone Land	No
Heritage	No
Heritage Conservation Area	No
Designated Development	No
Integrated Development	Yes – Pursuant to the Water Management Act 2000
Clause 4.6 variation	Yes – Application seeks a variation Clause 4.3 – Height and Clause 4.4 – FSR of PLEP 2011
Delegation	**Parramatta Local Planning Panel (application seeks variation to a development standard <10%).**

1. Executive Summary

This report considers the construction of and use of a multi-unit industrial warehouse and ancillary offices, storage premises, carparking and associated signage.

The subject site is zoned IN1 General Industrial. The local context includes various development and use types including similar warehouse developments, industrial uses, mixed use developments and reserves.

The topography of the site falls towards the reserve to the rear. To accommodate an appropriate building platform and for a transition throughout the built form, the development seeks to vary the maximum height applicable to the site by 2.59m or a departure of 21.5%. The impacts of the variation are discussed elsewhere in the report and is acceptable, having regard to the objectives of the standard and the zoning of the site.

Similarly, due to storage areas in the basement where it is located more than 1.1m above Natural Ground Level, a departure to the maximum Floor Space Ratio for the site is sought. The variation is a 2.5% departure to the standard and is considered minor in this regard. Given the minor nature of the departure, impacts on bulk and scale, density, presentation on the streetscape and potential traffic generation is negligible.

The application was advertised for a 30 day period and in response, no submissions were received.

The application was also reviewed by internal and external referrals. These referrals considered the proposal satisfactory, subject to conditions of consent.

Assessment of the application against the relevant planning framework and consideration of matters by Council's technical departments has not identified any fundamental issues of concern. The application is therefore satisfactory when evaluated against Section 4.15 of the Environmental Planning and Assessment Act 1979.

This report recommends that the Panel:

- Approve the application, subject to modifications to the conditions of consent.

2. Site Description and Conditions

The site is known as 150-152 Briens Road, Northmead and is legally described as Lot 111 in Deposited Plan 1160038. The site is irregular in shape, having a frontage of 103.9 metres to Briens Road, and a frontage of 84.4 metres to Mons Road, having a total area of 6,490m2.

Vehicular access to the site is currently obtained from Briens Road. The site is currently vacant and used for car parking. There is a substation along the Briens Road frontage. It is located within an established industrial area characterised by various industrial uses. The Westmead Hospital Precinct is located to the south across Toongabbie Creek.

The site is approximately 2km north-west of the Parramatta CBD. The site is within proximity to existing transport infrastructure routes including bus and rail networks.

The subject site has the following area and dimensions:
Area – 6,490m^2;
North – 103.9m;
South – 89.12m;
East – 67.085m; and
West – 37.29m.

The site is primarily zoned IN1 General Industrial under the provisions of PLEP 2011. Small portions of the site to the norther-eastern and north-western corners are zoned SP2 Infrastructure. It is noted that the proposed development is located wholly within the part of the site zoned IN1 General Industrial.

To clarify the location of the application site and specifically that of the subject site, refer to the aerial image in **Figure 1** below.

Figure 1: Aerial view of the subject site and surrounds. Subject site outlined in yellow. Source: Nearmap: August 2023.

2.1 Relevant Site History

Date	Comment
2 March 2021	DA/738/2019 approved the bulk earthworks, removal of eight (8) trees, construction and operation of an at-grade, controlled public car park for 183 vehicles including associated boomgates, business identification signage, public domain works operating 24 hours, 7 days a week on the subject site. The application was determined under delegation. It is noted that an operative consent has been issued and that the matters under Schedule 1 has not been met. However, evidence from the site inspection and aerial photos suggest that the site has been used for the purposes of a car park. The Statement of Environmental Effects also states that the site whilst vacant, had previously been used as a car park.

3. The Proposal

Development Application 19/2023 was lodged on 13 January 2023 for the Construction and use of multi-unit industrial warehouse and ancillary offices, storage premises, carparking and signage. Specifically, the application seeks approval for:

- Construction and use of a new two storey plus basement warehouse building comprising:
  - Basement parking and storage premises
  - Seventeen (17) ground floor industrial warehouse units with mezzanine office spaces and associated parking; and
  - Seventeen (17) first floor industrial warehouse units with mezzanine office spaces and associated car parking
- Associated infrastructure services.
- Associated vehicular access from Briens Road and car parking for 59 vehicles: and
- Tree removal, landscaping, perimeter fencing, and signage.

Figure 2: Photomontage. Source: nettletontribe

4. Permissibility

Parramatta Local Environmental Plan 2011

The application was lodged on 13 January 2023 which was prior to the gazettal of the PLEP 2023 on 2 March 2023. As such, the application is made pursuant to the provisions of PLEP 2011.

The site is zoned IN1 General Industrial with pockets of the site zoned SP2 Infrastructure. The sites to the north and east are also predominantly zoned IN1 General Industrial and is intersected by areas zoned as SP2 Infrastructure. The sites to the south and west are zoned RE1 Recreational. The site is also within proximity to sites zoned SP2 Health Services, B4 Mixed Use Zones and R2 Low Density Residential. See Zoning Map below.

Figure 3: Zoning Map. Subject site outlined in yellow. Source: (GISOnline)

The proposed development is defined as the following under PLEP 2011:

warehouse or distribution centre *means a building or place used mainly or exclusively for storing or handling items (whether goods or materials) pending their sale, but from which no retail sales are made.*

The warehouse is permissible with consent within the IN1 General Industrial zoning applying to the land.

As noted previously, the proposed development is located wholly within the areas of the subject site zoned IN1 General Industrial. No works are proposed on the parts of the site zoned SP2 Infrastructure.

5. Relevant Application History

Date	Comment
13 January 2023	DA/19/2023 was lodged with Council
24 January to 22 February 2023	30 day advertising / notification of the application.
2 March 2023	Council sends correspondence to the applicant requesting amended information including an amended landscape plan, stormwater plans, public domain plans and architectural plans.
15 March 2023	Council sends correspondence with regards to a further request for amended information regarding the on-site stormwater management.
3 May 2023	Additional information received
10 May 2023	Council sends correspondence with regards to a request for additional information regarding the concerns from WaterNSW.
17 May 2023	Council sends correspondence with regards to a request for amended information regarding an amended Arborist Report.
2 June 2023	Response to WaterNSW provided
9 August 2023	Additional / Amended information received
26 September 2023	Council sends correspondence with regards to a request for amended information regarding amended stormwater plans.
16 October 2023	Additional information submitted.

6. Referrals

Referral	Comment
Universal Access	No objections, subject to conditions of consent.
Open Space	No objections, subject to conditions of consent.
Urban Design	No objections, subject to conditions of consent.
Traffic	No objections, subject to conditions of consent.
Landscaping	No objections, subject to conditions of consent.

Property	No objections, subject to conditions of consent.
Contamination	No objections, subject to conditions of consent.
Acoustic	No objections, subject to conditions of consent.
Waste	No objections, subject to conditions of consent.
Engineering	No objections, subject to conditions of consent.
Sydney Water	Supported, subject to conditions of consent.
Transport for NSW (TfNSW)	Supported, subject to conditions of consent.
WaterNSW	No objections. It is noted that WaterNSW provided the following comments with regards to the proposal. *WaterNSW has reviewed the information submitted with the application for the construction and use of multi-unit industrial warehouse and ancillary offices, and storage premises, carparking & signage and considers that for the purposes of the Water Management Act 2000, no further investigation is required by WaterNSW.* *If groundwater is encountered during the development and requires removal, the proponent should contact WaterNSW immediately and apply for a dewatering water supply work approval. Failure to do so may result in NRAR taking compliance action under the Water Management Act 2000.* *As part of this application, they may need to provide a Dewatering Management Plan, Authority to Discharge groundwater as well as an updated Geotechnical Report that states volume of water to be taken, time frame of dewatering and basement construction (if relevant).* Given the above, General Terms of Approval were not issued.

PLANNING ASSESSMENT

7. Environmental Planning Instruments

7.1 Overview

The instruments applicable to this application are:

- Water Management Act 2000
- Biodiversity Conservation Act 2016
- Protection of the Environment Operations Act 1997
- State Environmental Planning Policy (Resilience and Hazards) 2021
- State Environmental Planning Policy (Transport and Infrastructure) 2021
- State Environmental Planning Policy (Biodiversity and Conservation) 2021
- State Environmental Planning Policy (Industry and Employment) 2021
- Parramatta Local Environmental Plan 2011
- Parramatta Development Control Plan 2011

Compliance with these instruments is addressed below.

7.2 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979 – INTEGRATED DEVELOPMENT

The application was lodged as Nominated Integrated Development under the provisions of the EPA Act. However, as previously mentioned upon review of the proposal, Water NSW confirmed that no further investigations were required. Accordingly, no General Terms of Approval were issued.

7.3 BIODIVERSITY CONSERVATION ACT 2016

Three (3) threatened fauna species (Southern Myotis, Large Bent-winged Bat and Eastern False Pipistrelle) and one (2) river-flat Eucalypt Forest on Coastal Floodplains were recorded within the development footprint. Pursuant to Clause 7.7 of the BC Act, as vegetation removal forms part of the application, it is to be accompanied by an Ecological Assessment Report (EAR).

The EAR submitted with the application, contained a Test of Significance in accordance with Clause 7.3 of the Act. The test of significance concluded that the proposal will not have a significant impact on any threatened species, populations, or ecological community. Accordingly, a Species Impact Statement is not required for the proposal nor biodiversity offsetting.

7.4 PROTECTION OF THE ENVIRONMENT OPERATIONS ACT 1997 (POEO Act)

The objectives of the Act are to protect, restore and enhance the quality of the environment having regard to the need to maintain ecologically sustainable development. The application is subject to the provisions of the Act as the development consists of:

"an industrial, agricultural or commercial activity or an activity of any other nature whatever (including the keeping of a substance or an animal"

Despite being a type of industrial activity, the proposed development for the purposes of warehousing is not listed as an activity of Schedule 1 of the POEO Act that would require an Environmental Protection License.

7.5 STATE ENVIRONMENTAL PLANNING POLICY (BIODIVERSITY AND CONSERVATION) 2021 – CHAPTER 2 VEGETATION IN NON-RURAL AREAS

The State Environmental Planning Policy (Biodiversity and Conservation) 2021 applies to the site. The aims of the plan are to protect the biodiversity values of trees and other vegetation in non-rural areas of the State, and to preserve the amenity of the non-rural areas of the State through the preservation of trees and other vegetation.

Council's Consultant Landscape Architect reviewed the application and assessed a total of seventy-nine (79) trees as part of the proposed development. Twelve (12) of these trees are recommended for removal. Upon review, Council's Landscape Architect raised no objections to its removal subject to appropriate conditions of consent.

It is considered that the removal of twelve (12) trees on site will not have an adverse impact of the ecological, heritage, aesthetic and cultural significance of the area. The proposed replacement planting will ensure that the development will not result in an unacceptable loss of amenity values or finite natural resources.

7.6 STATE ENVIRONMENTAL PLANNING POLICY (BIODIVERSITY AND CONSERVATION) 2021 – CHAPTER 10 SYDNEY HARBOUR CATCHMENT

The site is located within the designated hydrological catchment of Sydney Harbour and is subject to the provisions of the above SEPP. The aims of the Plan are to establish a balance between promoting a prosperous working harbour, maintaining a healthy and sustainable waterway environment and promoting recreational access to the foreshore and waterways by establishing planning principles and controls for the catchment as a whole.

Given the nature of the project and the location of the site, there are no specific controls that directly apply to this proposal, and any matters of general relevance (erosion control, etc) could have been managed by conditions of consent.

7.7 STATE ENVIRONMENTAL PLANNING POLICY (RESILIENCE AND HAZARDS) 2021 – CHAPTER 4 REMEDIATION OF LAND

The requirements of State Environmental Planning Policy (Resilience and Hazards) 2021 apply to the subject site. In accordance with Chapter 4 of the SEPP, Council must consider if the land is contaminated, if it is contaminated, is it suitable for the proposed use and if it is not suitable, can it be remediated to a standard such that it will be made suitable for the proposed use.

The site is not identified in Council's records as being contaminated. A site inspection reveals that the site is currently vacant. Notwithstanding, an Additional Site Investigation was prepared and submitted with the application. Upon investigation of the site and review of the relevant material, EIAustralia concluded:

- *No noticeable (i.e., visible or olfactory) signs of contamination, including potential asbestos containing materials (ACM), were observed during the inspection of the ground surface at the site.*
- *No evidences of the presence of underground petroleum storage systems (UPSS), underground storage tanks (UST) or above-ground storage tanks (AST) were noted on site*
- *Contaminant concentrations in representative soil samples were found to be below the adopted human health criteria applicable to commercial / industrial land use settings.*

- *Contaminant concentrations in groundwater were generally compliant with the adopted investigation levels (GILs)*
- *Based on the findings …the site can be made suitable for the potential future site development, provided the recommendations detailed in Section 10 are implemented.*

  The recommendations of the Report being:

  - *A data gap closure investigation, inclusive of one additional groundwater monitoring round to confirm groundwater quality and flow direction*
  - *A waste management plan should be prepared, to classify of waste material and surplus material including potential virgin excavated natural material (VENM) to be removed from the site, in accordance with the NSW EPA (2014) Waste Classification Guidelines, Protection of the Environment Operations Act 1997, and Work Health and Safety Regulation 2017;*
  - *Any soil/fill material imported onto the site should be assessed. Imported soil must be classified as virgin excavated natural material (VENM) or have a classification certificate indicating it is suitable for the proposed land use;*
  - *An unexpected finds protocol following site demolition and during site excavation to ensure any potential contamination sources (such as soil staining and odour, buried asbestos or underground storage tanks) are identified and managed in accordance with NSW EPA legislation and guidelines;*
  - *Based on the findings to be obtained from the data gap investigations, a Remediation Action Plan (RAP) might be required.*

Council's Environmental Health Officer (EHO) reviewed the ASI in concert with the application and upon review raised no objections to the proposal, subject to conditions of consent.

7.8 STATE ENVIRONMENTAL PLANNING POLICY (TRANSPORT AND INFRASTRUCTURE) 2021 – CHAPTER 2 INFRASTRUCTURE

The relevant matters to be considered under Chapter 2 of the SEPP for the proposed development are outlined below.

Chapter 2	Comment
Clause 2.45 – electricity infrastructure	The proposal does not require the provision of a new substation. An existing substation is located along the Briens Road frontage.
Clause 2.48 - Development likely to affect an electricity transmission or distribution network	N/A. The subject site is not within proximity to electricity infrastructure or substation.
Clause 2.100 – Development in or adjacent to rail corridors	N/A. The subject site does not adjoin a rail corridor.
Clause 2.119 – frontage to a classified road	Yes. The subject site does not have frontage to a classified road (Mons Road). With respect to the provisions of this clause: - Vehicular access is proposed via Briens Road to alleviate any traffic impacts on the classified road. - The proposed development does not result in the emission of smoke or dust. The proposed development is to be used for the purposes of warehousing only. - The proposed development for the purposes of warehousing is not of a sensitive nature that would be adversely impacted by traffic noise or vehicle emissions because of the proximity of the classified road.
Clause 2.120 – Impact of road noise or vibration on non-road development	N/A. This clause does not apply to the application as it is for the purposes of warehousing only.
Clause 2.122 – Traffic Generating Development	Yes. The meets the following criteria of Schedule 3 for referral to Transport for NSW (TfNSW). *Industry – 5000m² in site area or gross floor area with site access …to a road that connects to a classified room (if access within 90m of connection, measured along alignment of connecting road).* It is noted that Mons Road to the east of the site is approximately within 90m of the vehicle access to the site located on Briens Road. Upon review of the application, TfNSW raised no objections to the proposal and issued its conditions of consent.

7.9 STATE ENVIRONMENTAL PLANNING POLICY (INDUSTRY AND EMPLOYMENT) 2021 – CHAPTER 3 ADVERTISING AND SIGNAGE

SEPP Section	Comment
Chapter 3 Advertising and signage	The application seeks approval to construct various signage throughout the site. The type, location and details of the signs are as follows:

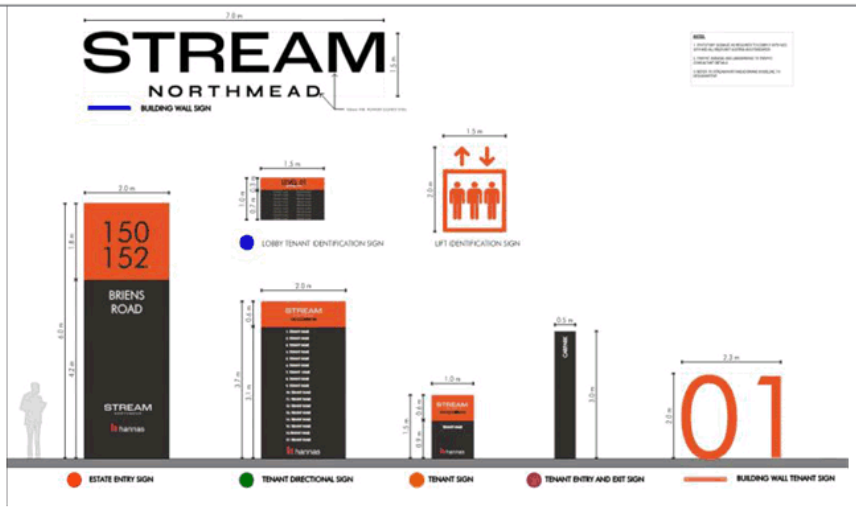


Figure 4: Signage details. Source: (nettleton tribe architects)

Figure 5: Signage locations. Source: (nettleton tribe architects)

See the below table for an assessment of the proposed signage zones against the criteria of the SEPP (Industry and Employment) 2021.

7.9.1 SCHEDULE 5 – ASSESSMENT CRITERIA

Considerations and Requirements	Compliance/Discussion
1 Character of the Area	
Is the proposal compatible with the existing or desired future character of the area or locality in which it is proposed to be located?	The design of the signs is modest and compatible with the existing and desired future character of the area.
Is the proposal consistent with a particular theme for outdoor advertising in the area or locality?	Whilst there is no theme for outdoor advertising in the locality, the design of the signs is modest and is compatible with the locality.
2 Special Areas	
Does the proposal detract from the amenity or visual quality of any environmentally sensitive areas, heritage areas, natural or other conservation areas, open space areas,	The proposed signs do not detract from the amenity or visual quality of any environmentally sensitive areas, in particular the bushlands associated with the Toongabbie Creek Reserve.

waterways, rural landscapes or residential areas?	
3 Views and Vistas	
Does the proposal obscure or compromise important views?	The proposal does no obscure or compromise important views.
Does the proposal dominate the skyline and reduce the quality of vistas?	The proposal does not dominate the skyline or reduce the quality of vistas.
Does the proposal respect the viewing rights of other advertisers?	The proposal respects the viewing rights of other advertisers.
4 Streetscape, setting or landscape	
Is the scale, proportion and form of the proposal appropriate for the streetscape, setting or landscape?	The proposed signs are of a scale and form that is appropriate for the streetscape and setting.
Does the proposal contribute to the visual interest of the streetscape, setting or landscape?	The proposal contributes to the visual interest of the setting and streetscape.
Does the proposal reduce clutter by rationalising and simplifying existing advertising?	The proposal does not reduce clutter by simplifying existing advertising.
Does the proposal screen unsightliness?	The proposed signs do not screen unsightliness.
Does the proposal protrude above buildings, structures or tree canopies in the area or locality?	The proposed signs do not protrude above buildings, tree canopies in the area or locality.
Does the proposal require ongoing vegetation management?	The proposed signs do not require ongoing vegetation management.
5 Site and building	
Is the proposal compatible with the scale, proportion and other characteristics of the site or building, or both, on which the proposed signage is to be located?	The proposal is compatible with the scale, proportions and characteristics of the site.
Does the proposal respect important features of the site or building, or both?	The proposal respects important features of the site and building.
Does the proposal show innovation and imagination in its relationship to the site or building, or both?	The proposed signs show innovation in its relationship to the site and building.
6 Associated devices and logos with advertisement and advertising structures	
Have any safety devices, platforms, lighting devices or logos been designed as an integral part of the signage or structure on which it is to be displayed?	The proposal provides details of its structure, frame and platform.
8 Safety	
Would the proposal reduce the safety for any public road?	The signs do not reduce safety for any public road.
Would the proposal reduce the safety for pedestrians or bicyclists?	The signs do not reduce safety for pedestrians and cyclists.
Would the proposal reduce the safety for pedestrians, particularly children, by obscuring sightlines from public areas?	The signs do not reduce safety for children by obscuring sightlines from public areas.

8. Parramatta Local Environmental Plan

8.1 Parramatta Local Environmental Plan 2023

In accordance with Clause 1.8A – Savings Provisions of PLEP 2023, as the current DA was lodged on prior to 2 March 2023, it shall be assessed under Parramatta Local Environmental Plan 2011.

It is noted that under PLEP 2023 the site is zoned E4 General Industrial.

8.2 Parramatta Local Environmental Plan 2011

The relevant matters considered under the PLEP 2011 for the proposed development are outlined below:

Clause 1.2 Aims of the Plan

2) The particular aims of this Plan are as follows—

(a) *to encourage a range of development, including housing, employment and recreation, that accommodates the needs of the existing and future residents, workers and visitors of Parramatta,*
(b) *to foster environmental, economic, social and physical wellbeing so that Parramatta develops as an integrated, balanced and sustainable city,*
(c) *to identify, conserve and promote Parramatta's natural and cultural heritage as the framework for its identity, prosperity, liveability and social development,*
(d) *to improve public access to the city and facilitate the maximum use of improved public transport, together with walking and cycling,*
(e) *to minimise risk to the community in areas subject to environmental hazards, particularly flooding and bushfire, by restricting development in sensitive areas,*
(f) *to protect and enhance the natural environment, including areas of remnant bushland in Parramatta, by incorporating principles of ecologically sustainable development into land use controls,*
(g) *to improve public access along waterways where natural values will not be diminished,*
(h) *to enhance the amenity and characteristics of established residential areas,*
(i) *to retain the predominant role of Parramatta's industrial areas,*
(j) *to ensure that development does not detract from the economic viability of Parramatta's commercial centres,*
(k) *to ensure that development does not detract from the operation of local or regional road systems,*
(l) *to ensure development occurs in a manner that protects, conserves and enhances natural resources, including waterways, riparian land, surface and groundwater quality and flows and dependant ecosystems.*

It is considered that the development satisfactorily meets the aims of the plan. In particular, the proposal encourages a range of development, including employment that accommodates the needs of the existing and future residents, workers and visitors of Parramatta. As such, the proposal is recommended for approval.

Clause 2.3 Zone objectives and Land Use Table

The aims and objectives for the IN1 zone in Clause 2.3 – Zone Objectives are as follows:

- *To provide a wide range of industrial and warehouse land uses.*
- *To encourage employment opportunities.*
- *To minimise any adverse effect of industry on other land uses.*
- *To support and protect industrial land for industrial uses.*
- *To facilitate a range of non-industrial land uses that serve the needs of workers and visitors.*

The proposal is consistent with these objectives and is therefore considered for approval, subject to conditions of consent.

Standards and Provisions	Compliance
Part 4 Principal development standards	
Cl. 4.3 Height of buildings Allowable: Max. 12m	**No. Clause 4.6 variation submitted.** Proposed: 14.59m (21.5% variation)
Cl. 4.4 Floor space ratio Allowable: 1:1 (max. 6490m^2)	**No. Clause 4.6 variation submitted.** Proposed: 6657m^2 (2.5% variation)
Part 5 Miscellaneous provisions	
Cl. 5.1 Relevant Acquisition Authority	The subject site is not subject to land reservation acquisition.
Cl. 5.3 Development near zone boundaries	The site immediately to the east is zoned SP2 Infrastructure and RE1 Public Recreation. However, the application does not seek approval for development under this provision.
Cl. 5.4 Controls relating to miscellaneous permissible uses	These provisions do not apply to the development proposal.
Cl. 5.6 Architectural roof features	An architectural roof feature is not proposed.
Cl. 5.7 Development below mean high water mark	The proposal is not for the development of land that is covered by tidal waters.
Cl. 5.10 Heritage conservation	Yes. The site is not a heritage item or located within a Heritage Conservation Area. However, the site is located in the vicinity of a local heritage item (I36 –

	Arrunga Reserve) under Schedule 5 of LEP 2011. Given the distance between the subject site and the heritage item, it does not in this instance detract from the heritage characteristics of this item.
Cl. 5.11 Bush Fire hazard reduction	The site is not identified as bush fire prone.
Cl. 5.21 Flood Planning	The subject site is identified as flood prone. Council's Development Engineer has reviewed the proposal with regards to the provisions of this clause. The development is considered to provide a built form that is compatible with the flood function and behaviour of the land.
Part 6 Additional local provisions	
Cl. 6.1 Acid sulfate soils	Yes, the site is identified as containing Class 5 Acid Sulfate Soil. An Acid Sulphate Soils Management Plan is not required to be prepared in this instance.
Cl. 6.2 Earthworks	Council's Development Engineer has reviewed the application and considers that the proposed earthworks are satisfactory.
Cl. 6.4 Biodiversity protection	The site is not identified on this map.
Cl. 6.5 Water Protection	The site is not identified on this map.
Cl. 6.6 Landslide risk	The site is not identified on this map.
Cl. 6.7 Foreshore Building Line	The subject site does not have frontage to a foreshore.
Cl. 6.12 Design Excellence	The subject site is not identified as requiring the exhibition of Design Excellence.

8.1 Clause 4.6 Variation Assessment – Height and FSR

The proposal seeks approval for variations to the following development standards.

Clause	Clause 4.3 – Height
Standard	12m
Proposal	14.59m
Variation	2.59m variation or 21.5%

Clause	Clause 4.4 – Floor Space Ratio (FSR)
Standard	1:1 (6490m2)
Proposal	6657m2
Variation	167m2 variation or 2.5%

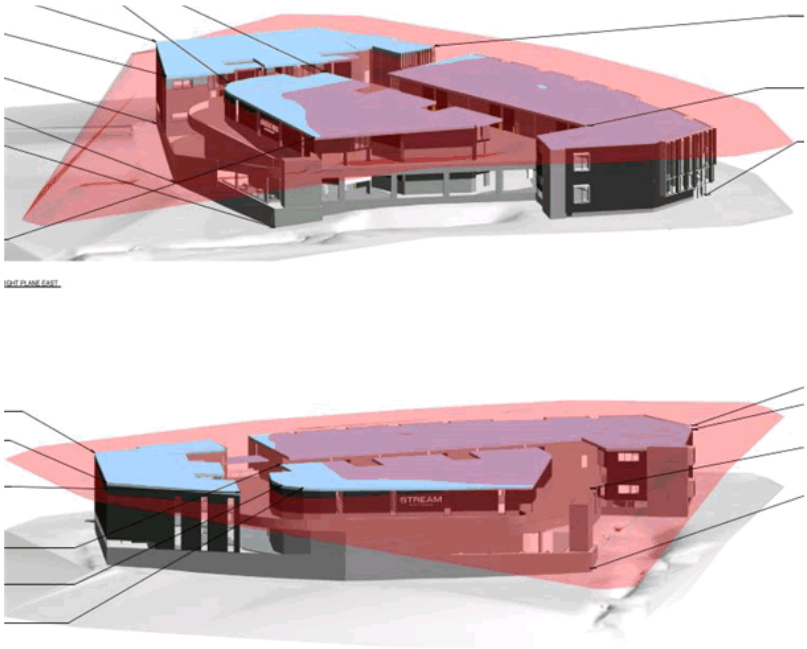


Figure 6: Height Plane Perspectives. Areas coloured blue are above the maximum height. Source: (nettleton tribe architects)

Clause 4.6 allows Council to provide an appropriate degree of flexibility in applying certain development standards, where flexibility would achieve better outcomes.

Clause 4.6(1) – Objectives of Clause 4.6

The objectives of clause 4.6 are considered as follows:

"(a) to provide an appropriate degree of flexibility in applying certain development standards to particular development,
(b) to achieve better outcomes for and from development by allowing flexibility in particular circumstances"

Clause 4.6(2) – Operation of Clause 4.6

The operation of clause 4.6 is not limited by the terms of Clause 4.6(8) of LEP 2023, or otherwise by any other instrument.

Clause 4.6(3) – The Applicant's written request 4.6

Clause 4.6(3) requires that the applicant provide a written request seeking to justify contravention of the development standard. The request must demonstrate that:

"(a) compliance with the development standard is unreasonable or unnecessary in the circumstances of the case, and
(b) there are sufficient environmental planning grounds to justify contravening the development standard."

The applicant has submitted a written request justifying the variation to the Height and FSR. The applicant justification as follows (**The full request is included in Attachment A and B**):

Height

- *The Proposal is consistent with the existing and desired future character of the Site and locality and the surrounding area in that it provides for a scale of development that when viewed from the streetscape and surrounding properties is not dominant in terms of bulk, scale, extent of hardstand or interface with the streetscape. It is argued that the Proposal provides a development outcome that, in replacing the existing underutilised vacant Site, improves the character of the area.*

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- *The presentation of the Proposal to the public domain is now generally compliant with the maximum height development standard. Therefore, the Proposal is considered to provide an overall bulk and scale to Briens Road and the public domain that is consistent with the desired future character for the area as expressed by the key development controls applicable to the Site.*
- *The maximum variation to the development standard of 14.59 metres is located at the rear (south) of the Site due to the natural topography of the Site. The Site falls some 2.2 metres from north to south and given the nature of the use it is not practicable to step the building to follow that fall. Notwithstanding, this part of the Site is not readily visible from any road frontage of the Site and does not contribute to the streetscape presentation of the building.*
- *It is noted that the Proposal and the exceedance does not result in any additional or unacceptable impact on other land uses by way of visual impact, disruption of views, loss of privacy, loss of solar access, traffic impact or loss of on-street parking capacity of the like, and the Proposal is not readily visible from any residential-zoned land or other sensitive receiver. Therefore, the Proposal does not result in any unreasonable impacts on adjoining development.*
- *The proposed height variation will retain compatibility with surrounding development and continue to support a wide range of industrial and warehouse land uses in the locality, consistent with the objectives of the IN1 General Industrial zone.*

FSR

- *The Proposal results in a variation of 167sqm or 2.5% which is negligible in respect of the entire scheme.*
- *It is noted that the portion of the Proposal that provides additional GFA to exceed the FSR development standard, being the basement level, is not visible from any public place and does not add any additional bulk to the Proposal.*
- *A reduction in the scale of the development to reduce the Proposal to a compliant FSR would involve removing the basement level hence reducing the GFA. This change would not be readily visible from the public domain and would not result in an improved streetscape presentation. Therefore, complying with the standard would have no material benefit on the streetscape presentation.*
- *While compliance may be achieved by reducing the GFA of the Proposal, this is considered to undermine the functionality of the building; and the operational requirements the end-users will be unable to be facilitated. The Proposal seeks to provide a variety of tenancy spaces and configurations to suit the need of a spectrum of future industrial tenants. Furthermore, all required car parking for the industrial warehouse units can be accommodated on the ground and first floor levels, therefore the basement is not required for car parking.*
- *It is noted that the Proposal and the exceedance does not result in any additional or unacceptable impact on other land uses, and the Proposal is not readily visible from any residential-zoned land or other sensitive receiver. The Proposal does not result in any unreasonable impacts on adjoining development in respect of overshadowing, visual bulk, privacy or other amenity impacts due to the island nature of the Site.*
- *The proposed FSR variation will retain compatibility with surrounding development and continue to support a wide range of industrial and warehouse land uses in the locality, consistent with the objectives of the IN1 General Industrial zone.*

Clause 4.6(4) – Consent Authority Consideration of Proposed Variation

Clause 4.6(4) outlines that development consent must not be granted for development that contravenes a development standard unless:

"a) the consent authority is satisfied that:

i) the applicant's written request has adequately addressed the matters required to be demonstrated by subclause (3), and

ii) the proposed development will be in the public interest because it is consistent with the objectives of the particular standard and the objectives for development within the zone in which the development is proposed to be carried out, and

b) the concurrence of the Secretary has been obtained."

Unreasonable and Unnecessary

Case law in the NSW Land & Environment Court has considered circumstances in which an exception to a development standard may be well founded. In the case of *Wehbe v Pittwater Council [2007] NSWLEC 827* the presiding Chief Judge

outlined the following five (5) circumstances:

1. *The objectives of the development standard are achieved notwithstanding non-compliance with the standard.*

   The written request contends that the development is consistent with the standard and zone objectives.

Height

The objectives of Clause 4.3 – Height and Council's comments in response to the proposal are as follows.

Clause 4.3 Height Objectives	Council Officer Assessment
(a) to nominate heights that will provide a transition in built form and land use intensity within the area covered by this Plan,	The proposed variation to the height occurs to the rear and western portions of the development to allow a built form that transitions with the topography of the site which falls towards the adjoining reserve to the south and south-west. In this instance, it is considered that objective (a) is met despite the variation to the standard.
(b) to minimise visual impact, disruption of views, loss of privacy and loss of solar access to existing development,	The maximum variation of 2.59m which occurs to the rear of the development does not in this instance: - result in any visual impacts. Most of the height exceedances is located towards the rear where it cannot be seen at a street level and south-west where the built form is obscured by the reserve and is of ample distance from neighbouring development. The portion of the development that exceeds the height that is located to the front of the building is minor and is imperceptible when viewed from the street. - The subject site is not identified as containing significant views per Appendix 2 of PDCP 2011. - The subject site is located ample distance from any residential development and therefore any variations to the height is unlikely to result in any loss of privacy. - Similarly, due to the ample distance to the closest development, it is unlikely that any variation to the height will result in any loss of solar access. Further, any additional overshadowing to the reserve to the south is acceptable given that the development was amended to increase the rear setback to allow an appropriate buffer to the reserve and improve solar access outcomes.
(c) to require the height of future buildings to have regard to heritage sites and their settings,	The site is not identified as heritage. The site does not adjoin any sites identified as heritage under Schedule 5 of PLEP 2011. The site is not located within a heritage conservation area. It is noted that the site is located within proximity to Arrunga Reserve which is heritage listed. However, it is of ample distance from the development. As such, it is unlikely that the development will adversely impact this item and its setting.
(d) to ensure the preservation of historic views,	As previously noted, the site is not identified as containing significant views which includes historic views and vistas.
(e) to reinforce and respect the existing character and scale of low density residential areas,	The subject site is not zoned R2 Low Density Residential nor is it located within proximity to sites identified as R2 Low Density Residential.
(f) to maintain satisfactory sky exposure and daylight to existing buildings within commercial centres, to the sides and rear of tower forms and to key areas of the public domain, including parks, streets and lanes.	The subject site is not located within a commercial zone. It is noted however, that the reserves to the south and south east retain acceptable solar access during the winter solstice despite the variation to the standard.

FSR

The objectives of Clause 4.4 – Floor Space Ratio (FSR) and Council's comments in response to the proposal are as follows.

Clause 4.4 FSR Objectives	Council Officer Assessment

(a) to regulate density of development and generation of vehicular and pedestrian traffic,	The departure to the FSR standard represents only a 2.5% variation and is a result of floor area located within the basement. Nevertheless, the departure is minor and, in this instance, does not result in overdevelopment. It is noted that both Council's Traffic Engineer as well as TfNSW raised no objections to the vehicular and/or pedestrian traffic generation because of the proposal, subject to conditions of consent.
(b) to provide a transition in built form and land use intensity within the area covered by this Plan,	As previously noted, the departure to the standard is minor at 2.5%. Further, the floor area that exceeds the maximum standard is in the basement where it does not contribute to the built form. The departure to the FSR standard is also considered appropriate in this instance given that the subject site is located of ample distance from the closest development and is mostly obscured by the reserves to the south and east. Accordingly, the proposal is of an appropriate density and land use within the context of the site and locality.
(c) to require the bulk and scale of future buildings to have regard to heritage sites and their settings,	The subject site is located within proximity to Arrunga Reserve which is a heritage listed site. However, given its distance, it is unlikely that the development will adversely impact this item and its setting.
(d) to reinforce and respect the existing character and scale of low density residential areas.	The subject site is not zoned R2 Low Density Residential nor is it located within proximity to sites identified as R2 Low Density Residential.

2. *The underlying objective or purpose is not relevant to the development with the consequence that compliance is unnecessary.*

   The applicant does not suggest that the purpose of either the FSR or Height standard is not relevant to the development.

3. *The underlying objectives or purpose would be defeated or thwarted if compliance was required with the consequence that compliance is unreasonable.*

   The written requests for the variations to the standards do not suggest that the purpose of this standard would be thwarted if compliance was required, but rather the objectives are achieved despite the breach to the development standards.

4. *The development standard has been virtually abandoned or destroyed by the Council's own actions in granting consents departing from the standard and hence compliance with the standard is unnecessary and unreasonable.*

   The applicant does not challenge the FSR standard has been abandoned.

   The applicant has however, provided examples of previously approved developments within proximity to the site that have been departed from the maximum height. The Coca Cola site at 104 – 108 Briens Road was approved with a height variation of 20 metres and was determined by the Department of Planning, Industry and Environment under the former Part 3A of the EP&A Act 1979. A recently approved addition within the Coca Cola site was also approved with a 9.41m departure to the height standard. Whilst this was determined and approved by the Parramatta Local Planning Panel, this most recent departure does not exceed the overall maximum height of 32m Coca Cola automated warehouse approved by the Department.

   The 7- storey mixed use development located at 32 – 34 Mons Road, Westmead was approved under PLEP 2001 with applicable height and density controls located within a wider Masterplan for the area which the development complied with. As such, Council has not in this instance consider the development standard to be abandoned or destroyed by Council's actions in granting consents departing from the standard.

5. *The zoning of particular land is unreasonable or inappropriate so that a development standard appropriate for that zoning was also unreasonable or unnecessary as it applied to that land and that compliance with the standard in that case would also be unreasonable or unnecessary.*

   The written requests do not challenge that the IN1 zoning is unreasonable or inappropriate or that the

standards for that IN1 zoning is also unreasonable or unnecessary.

Sufficient Environmental Planning Grounds

The decision in the Land & Environment Court case of *Four2Five Pty Ltd v Ashfield Council [2015] NSWLEC 90*, suggests that 'sufficient environmental planning grounds' for a Clause 4.6 variation is more onerous than compliance with zone and standard objectives. The Commissioner in the case also established that the additional grounds had to be particular to the circumstances of the proposed development, and not merely grounds that would apply to any similar development. Furthermore, the decision in the Land and Environment Court case of *Initial Action Pty Ltd v Woollahra Municipal Council* [2018] NSWLEC 118 established that the focus must be on the aspect of the development that contravenes the development standard, not the development as a whole.

The written request in this instance demonstrate sufficient environmental planning grounds for the Clause 4.6 variation to the **Height**, for the following reasons:

- The maximum height variation of 2.59m occurs to the rear of the development where it is obscured from the street and by the reserves to the south and west of the site. The variation in this instance is due to the sloping topography of the site to the south as it falls towards the reserve. The departure to the height allows for a transition in height from the front to the rear without compromising the building platform and design of the built form.
- Despite the variation to the height, it is unlikely to result in any adverse amenity impacts to adjoining developments given its location and its ample distance from other developments. As previously noted, the site is also obscured by the reserves to the south and west of the site and any variations to the height will be indiscernible from view from these properties.
- Irrespective of the variation to the height, it does not in this instance create an unreasonable loss of solar access, to the reserve to the south. The development has been amended to increase its setback to this area which has improved any solar access impacts to the reserve. Large tree canopies are also located within the reserves so that any development on the subject site is unlikely to have significant solar access impacts to these areas.
- The development provides appropriate setbacks, landscaping and achieve good design so that the variation to the height does not in this instance, detract from these outcomes. As a result, the bulk of the development is consistent and sympathetic with the existing and desired future development for the locality.
- Whilst a portion of the built form within the front exceeds the maximum height, this exceedance is minor when viewed within the context of the site and the size of the development and as a result, does not impact on the presentation of the built form on the streetscape when viewed at a pedestrian level.

Similarly, the written request in this instance demonstrates sufficient environmental planning grounds for the Clause 4.6 variation to the **FSR**, for the following reasons:

- The variation is a 2.5% departure to the standard and is minor in this instance. The variation is a result of floor area located within the basement. In this regard, the additional floor area does not unreasonably result in a bulky development. It also does not contribute to unreasonable density in the location or result in an overdevelopment of the site.
- The development applies generally compliant building setbacks, articulation, landscaping and good urban design so that a minor departure to the FSR as proposed is not visible within the streetscape or neighbouring developments.
- The minor departure to the FSR does not result in unreasonable vehicular or pedestrian traffic that would otherwise be expected for similar developments within this location. Council's Traffic Engineer and TfNSW does not object to the proposal with regards to traffic, subject to conditions of consent.
- The minor variation to the FSR does not result in unreasonable overshadowing of adjoining development or to the reserve, loss of amenity to neighbouring developments or loss of views.

Public Interest

Clause 4.6(4)(a)(ii) requires that the consent authority be satisfied that the development is in the public interest because it is consistent with the relevant zone objectives. The objectives of the IN1 General Industrial zone and planners' assessment are provided below:

IN1 Zone Objectives	Comment

• *To provide a wide range of industrial and warehouse land uses.*	The proposed development is for the purposes of warehousing.
• *To encourage employment opportunities.*	The proposed development for the purposes of warehousing will generate employment opportunities through staffing and operational requirements.
• *To minimise any adverse effect of industry on other land uses.*	The proposal has been designed to ensure that the development does not result in any significant adverse impacts on industry and other land uses. It is also noted that the subject site is located of ample distance from other developments within proximity to the site. The site is bounded by reserves to the south and west and a classified road to the east.
• *To support and protect industrial land for industrial uses.*	The proposed development for the purposes of warehousing contributes to the protection of industrial land for industrial use.
• *To facilitate a range of non-industrial land uses that serve the needs of workers and visitors.*	The proposed use of the development as a warehouse is an industrial use.

Concurrence

Assumed concurrence is provided to local planning panels (such as the PLPP) as per NSW Department of Planning Circular '*Variations to development standards*' Ref: PS 20-002 dated 5 May 2020. There is no limit to the level of non-compliance for which concurrence can be assumed.

a) Conclusion

In summary, it is considered that the applicant's request to vary the maximum height and FSR **should** be supported for the following reasons:

- The proposal is consistent with the objectives of the IN1 General Industrial zone and as it is a development that has been designed to relate and be sympathetic to the site conditions, existing and future developments, and the locality.
- There are sufficient environmental planning grounds to justify the departure, in particular compliance with the objectives and controls of Parramatta DCP 2011.

The proposal is in the public interest and is consistent with the zone objectives. In this regard, the departures to the height and FSR standards are supported.

9. The Parramatta Development Control Plan 2011

A consideration of the relevant sections of the PDCP 2011 is provided below.

Development Control	Comment	Comply
	Part 2 Site Planning	
2.4.1 Views and Vistas	The site is not identified as containing significant views.	Yes
2.4.2 Water Management 2.4.2.1 Flooding	The site is identified as being flood prone. Council's Catchment and Development Engineer has reviewed the application and considers the proposal to be satisfactory subject to conditions of consent.	Yes
2.4.2.2 Protection of Waterways	While the proposed development does not directly adjoin a waterway, it is within proximity to a waterway (Toongabbie Creek). There is an existing buffer comprising Toongabbie Creek Reserve between the site and the waterway. No changes are proposed to the buffer area under the subject application.	Yes
2.4.2.3 Protection of Groundwater	Appropriate measures are proposed. Council's Catchment and Development Engineer has reviewed the application and considers the proposal satisfactory.	Yes

	The application was also referred to WaterNSW. In response, it was advised that no further investigation by WaterNSW was required and provided / issued Council and the applicant advisory notes if groundwater is encountered during works.	
2.4.3 Soil Management	An Erosion and Sediment Control Plan was submitted with the Development Application. Relevant conditions of consent are included to ensure that the proposal will not result in adverse sedimentation impacts.	Yes
2.4.4 Land Contamination	Refer to Section 7.7 of this report for a detailed discussion.	Yes
2.4.5 Air Quality	The proposed development is for the purposes of warehousing which is unlikely to result in the emission of atmospheric pollutants. Relevant conditions of consent are included to ensure that the development does not give rise to unacceptable air quality impacts during the demolition and construction stages.	Yes
2.4.6 Development on Sloping Land	While bulk earthworks are proposed to accommodate the basement, appropriate cut and fill are proposed and minimised where possible. The development has been designed in concert with the topography and has provided an adequate building platform.	Yes
2.4.7 Biodiversity	Council's Consultant Landscape Architect raised no objections to the removal of twelve (12) trees subject to appropriate conditions of consent. It is considered that the removal of twelve (12) trees on site will not have an adverse impact of the ecological, heritage, aesthetic and cultural significance of the area.	Yes
2.4.7.2 Development on land abutting the E2 Environmental Protection Zone and W1 Natural Waterways Zone	The site does not adjoin land zoned E2 or W1.	N/A
2.4.8 Public Domain	The proposal provides adequate passive surveillance to Briens Road. Public access to the public domain is retained and the development has been designed to address elements of the public domain where possible. A 1.5m wide pedestrian footpath is proposed along the Briens Road street frontage. Council's Urban Designer has reviewed the proposal with respect to the public domain and raised no objections, subject to conditions of consent.	Yes
Part 3 Development Principles		
3.2.1 Building Form and Massing	Despite the variation to the maximum height and FSR for the site, the development has been designed to minimise the impacts of these variations to neighbouring development and to the adjoining reserves whilst delivering a built form with good design outcomes that also presents well on the streetscape. Accordingly, the building form and mass is compatible with the character and spatial characteristics of the locality.	Yes
3.2.2 Building Façade and Articulation	The proposal incorporates adequate articulation, materials, and fenestrations in the composition of the facades which assist in breaking up the visual scale and bulk of the development and the perception of building mass.	Yes
3.2.3 Roof Design	The roof design is consistent with the roof patterns of the existing developments in the area and is not that dissimilar to other warehouse developments located in an industrial setting.	Yes
3.2.5 Streetscape	The proposed development is compatible with the existing and future character of the locality. The presentation of the development on Briens Road and Mons Road are acceptable and is consistent with the form of development	Yes

	expected in this location. Despite the variations to the height and FSR, the development has been designed to reduce adverse impacts on the streetscape through general compliance with setbacks and landscaping. In this regard, the proposal is considered to positively contribute to the streetscape.	
3.2.6 Fences	A front fence is not proposed.	N/A
3.1.3: Building Height Maximum: 12m	See Section 8.1 of this report for further discussion.	**No, but acceptable**
3.1.3 Floor Space Ratio	See Section 8.1 of this report for further discussion.	**No, but acceptable**
3.1.3: Front Setback Control: Correspond to Predominant Building Line	Proposed: 4.5m to Briens Road and 3m to Mons Road	Yes
3.1.3: Side Setback Control: Nil where there are no impact on streetscape or amenity of adjoining development	Proposed: 2m from the basement and 1.8m from ground floor. As noted elsewhere in the report, the proposed setbacks do not in this instance result in adverse impacts on the streetscape and due to location of the site, the proposed setbacks do not impact on any adjoining development.	Yes
3.1.3: Rear Setback Control: Dependent on impact on amenity of adjoining development	Provided: 4m The rear setback has been amended to reduce impacts on the reserve to the south of the site.	Yes
3.1.3: Landscaped Area Min. 10% of the site and 2.5m dimension	Proposed: 685m^2 (10.5%)	Yes
3.3.3 Visual and Acoustic Privacy	The proposal is unlikely to result in adverse visual or acoustic privacy impacts as the site is not located in the proximity of any residential zoned land.	Yes
3.3.5 Solar Access and Cross Ventilation	The proposal does not result in adverse solar access or cross ventilation impacts.	Yes
3.3.6 Water Sensitive Urban Design	Council's Catchment and Development Engineer has reviewed the application and considers the proposed WSUD measures appropriate.	Yes
3.3.6.1 Stormwater Drainage	Council's Catchment and Development Engineer has reviewed the application and considers the proposed stormwater drainage measures appropriate.	Yes
3.3.6.2 Water Efficiency	Council's Catchment and Development Engineer has reviewed the application and considers the proposed water efficiency measures appropriate.	Yes
3.3.6.3 Grey Water	Council's Catchment and Development Engineer has reviewed the application and considers the proposed grey water measures appropriate.	Yes
3.3.7 Waste Management	Council's Waste Officer reviewed the proposal and upon review, raised no objections to the development, subject to conditions of consent.	Yes
3.4 Social Amenity		
3.4.1 Culture and Public Art	An arts plan is not required as the application is not located within: - A local town centre - Land zoned B2 Local Centre or B4 Mixed Use	N/A
3.4.2 Access for People with Disabilities	The application was submitted with an Accessibility Report which was reviewed by Council's Universal Access Officer. Upon review, Council's Universal Access Officer raised no objections with the proposal subject to conditions of consent.	Yes
3.4.3 Amenities in Buildings Available to the Public	The proposal is not a public building.	N/A

3.4.4 Safety and Security	Passive surveillance from within the development is provided. All warehouse units with an address to a frontage are provided with windows to allow surveillance of public areas.	Yes
3.5 Heritage	The site is not a heritage item or located within a Heritage Conservation Area. The site is located in the vicinity of a local heritage item (I36) under Schedule 5 of LEP 2011. The proposal does not detract from the heritage characteristics of this item.	Yes
3.5.2 Archaeology	The site is identified as having potential for local archaeological heritage significance. A condition will be placed on the consent requiring the consent holder to approach the NSW State Heritage Office prior to any works, including bulk earthworks, to satisfy any archaeological requirements for the site.	Yes
3.5.3 Aboriginal Cultural Heritage	The site is identified as having low aboriginal heritage significance. The proposal is unlikely to impact upon any items of aboriginal cultural heritage.	Yes
3.6 Movement and Circulation		
3.6.1 Sustainable Transport	Car share spaces are not required to be provided for the development as the site is not located within 800m of a railway station or within 400m of a frequently serviced bus stop.	N/A
3.6.2 Parking and Vehicular Access	PDCP 2011 does not contain parking rates for warehouses or storage units. RMS parking rates for warehouses and self-storage facilities were utilised for the purposes of car parking calculation in this instance. RMS Guide to Traffic Generating Developments - Warehouses • 1 space per 300m² of GFA = 1 x (6,181m² warehouses and the associated ancilary offices ÷ 300) = 20.6 (21) Storage units: • 6 space for storage leaseable area up to 3,000m² (based on the Self-Storage Facility Traffic & Parking Study prepared by Aurecon as indicated in the submitted Traffic Impact Assessment report) = 6 (as the total storage GFA is 2,141m²) The development proposes 59 parking spaces.	Yes
3.6.3 Accessibility and Connectivity	A 1.5m pedestrian footpath is to be provided across the Brines Road frontage. The development will retain the pedestrian link along Mons Road. Public and private areas are clearly delineated.	Yes
3.7.2 Site Consolidation and Development on Isolated Sites	The proposal does not result in the isolation of any adjoining properties.	N/A
Part 4 Special Precincts		
4.3.4 Westmead	The subject site is identified as being within the Westmead Strategic Precinct. Notwithstanding, the controls relate to the WSU site and development located within proximity to the Sydney West Metro Link. No controls apply to the subject site.	N/A

10. Development Contributions

As this Development Application was lodged on 13 January 2023, the City of Parramatta (Outside of Parramatta) CBD Contributions Plan 2021 applies to the land. A standard condition of consent is to be imposed requiring the contribution to be paid prior to the issue of a Construction Certificate.

11. Bonds

Pursuant to Council's Schedule of Fees and Charges, the developer will be obliged to pay Security Bonds to ensure the

protection of civil infrastructure located in the public domain adjacent to the site. A standard condition is to be imposed on the consent requiring the Security Bond to be paid prior to the issue of a Construction Certificate.

12. EP&A Regulation 2021

Applicable Regulation considerations including demolition, fire safety, fire upgrades, compliance with the Building Code of Australia, compliance with the Home Building Act, PCA appointment, notice of commencement of works, sign on work sites, critical stage inspections and records of inspection is to be addressed by appropriate consent conditions.

13. The likely impacts of the development

The assessment demonstrates that the proposal will not have any significant adverse impact upon any adjoining properties and the environment through non-compliance with the applicable planning instruments and controls. All relevant issues regarding environmental impacts of the development are discussed elsewhere in this report, including built environment impacts such as built form. In the context of the site and the assessments provided by Council's experts, the development is considered satisfactory in terms of environmental impacts and can be considered for support.

14. Suitability of the Site

The proposed development for the purposes of warehousing and storage is suitable on the subject site. Despite the variations to the height and FSR, the impacts of these departures are imperceptible. The development results in an acceptable design outcome.

The accessibility of the site, traffic and on-site stormwater management have been adequately addressed to ensure that it does result in adverse impact on the proposed development.

For the above reasons and those stated throughout this report, the site is considered to be suitable for the proposed development.

15. Public Consultation

The application was notified and advertised in accordance with the City of Parramatta Consolidated Notification Procedure.

The advertisement ran for a 30-day period between 24 January and 22 February 2023. In response to the notification period, no submissions were received.

Amended Plans Yes.

Summary of amendments (if applicable)

- Amended Arborist Report;
- Amended Civil Engineering Drawings;
- Amended Traffic Report;
- Amended Landscape Plan;
- Amended Ecological Assessment;
- Amended Watercourse Assessment; and
- Revised Architectural Plans

In accordance with Council's notification procedures, the application did not require re-notification as the amended application is considered to be substantially the same development and does not result in a greater environmental impact.

16. Public interest

For reasons discussed throughout this report, the proposal would not be contrary to the public interest.

17. Conclusion

The application has been assessed relative to section 4.15 of the Environmental Planning and Assessment Act 1979, taking into consideration all relevant state and local planning controls.

Having regard to the assessment of the proposal from a merit perspective, Council officers are satisfied that the development has been appropriately designed and will provide acceptable levels of amenity for future users. It is considered that the proposal sufficiently minimises adverse impacts on the amenity of neighbouring properties. Hence the development, is consistent with the intentions of the relevant planning controls and represents a form of development contemplated by the relevant statutory and non-statutory controls applying to the land. The proposal has demonstrated a satisfactory response to the objectives and controls of the applicable planning framework.

For these reasons, it is considered that the proposal **is** satisfactory having regard to the matters of consideration under Section 4.15 of the Environmental Planning and Assessment Act, 1979 and is recommended for a deferred commencement approval subject to conditions of consent.

18. Recommendation

Pursuant to Section 4.16 of the Environmental Planning and Assessment Act, 1979:

A. **That**, the Parramatta Local Planning Panel support the variation to Clause 4.3 of Parramatta Local Environmental Plan under the provisions of Clause 4.16 for the following reasons:

B. **That** the Parramatta Local Planning Panel, exercising the function of the consent authority, grant **deferred commencement development consent** to DA/19/2023 for the construction and use of multi-unit industrial warehouse and ancillary offices, storage premises, carparking & signage for the following reasons:

   a. The development is permissible in the IN1 General Industrial zone pursuant to the Parramatta Local Environmental Plan 2011 and satisfies the requirements of all applicable planning standards controls.
   b. The development will protect the natural environment.
   c. The development will not adversely impact on the visual character of the area.
   d. For the reasons given above, approval of the application is in the public interest.

C. **That** the Parramatta Local Planning Panel, approve the Clause 4.6 variation to the Height for the following reasons:

   a. The departure representing a variation of 21.5% from the standard is reasonable and allows for a transition of height that is sympathetic with the existing topography whilst providing good urban design and an appropriate building platform.
   b. The departure does not result in adverse amenity impacts to adjoining developments and to the reserve.
   c. Despite the departure the development remains generally consistent with the controls and provisions of DCP 2011.
   d. The variation to the height does not result in unreasonable perception of bulk and scale.

D. **That** the Parramatta Local Planning Panel, approve the Clause 4.6 variation to the FSR for the following reasons:

   a. The variation is a 2.5% departure to the standard and is minor in this instance and is a result of floor area located within the basement which does not unreasonably result in a bulky development.
   b. The development remains generally compliant with building setbacks, articulation, landscaping and good urban design so that any exceedance in FSR is negligible on the streetscape and neighbouring developments.
   c. The minor departure to the FSR does not result in unreasonable vehicular or pedestrian traffic that would otherwise be expected for similar developments within this location.
   d. The minor variation to the FSR does not result in unreasonable overshadowing of adjoining development or to the reserve, loss of amenity to neighbouring developments or loss of views.

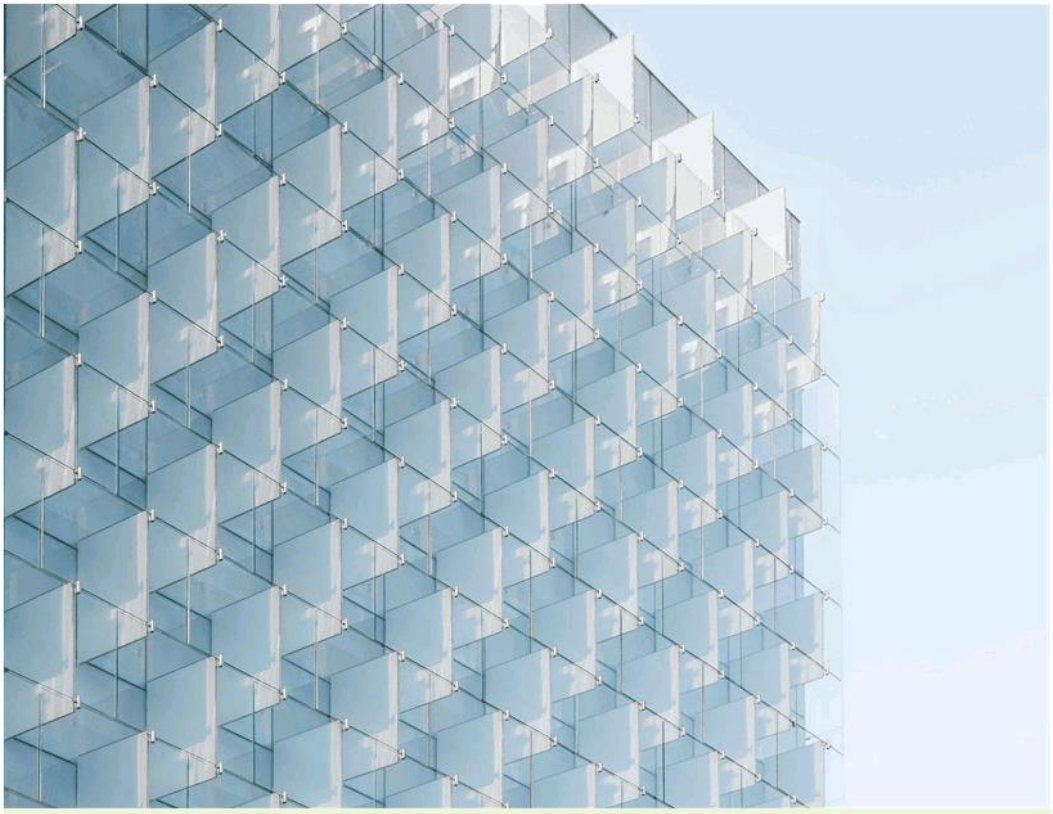
Attachment A

Applicant Clause 4.6 Variation - Height

WILLOWTREE PLANNING

1 November 2023

Ref: WTJ22-523
Contact: Asher Richardson



CLAUSE 4.6 VARIATION REQUEST
HEIGHT OF BUILDINGS

CONSTRUCTION AND USE OF MULTI-UNIT INDUSTRIAL WAREHOUSE AND ANCILLARY OFFICES, STORAGE PREMISES, CARPARKING & SIGNAGE

150-152 Briens Road, Northmead
(Lot 111 DP 1160038)

Prepared by Willowtree Planning Pty Ltd
on behalf of Hannas Group

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SYDNEY I NEWCASTLE I GOLD COAST I BRISBANE

Clause 4.6 Variation Request
Construction and use of multi-unit industrial warehouse and ancillary offices, storage premises, carparking and signage
150-152 Briens Road, Northmead

In the spirit of reconciliation and recognition, Willowtree Planning acknowledges the Traditional Owners of this Country throughout Australia and their continuing and ongoing connections to land, waters and community. We show our respect to Elders – past and present. We acknowledge that we stand on this Country which was and always will be recognised as Aboriginal Land. We acknowledge the Traditional Owners of the Lands in this Local Government Area, belonging to the local Aboriginal People, where this proposal is located upon.

DOCUMENT CONTROL TABLE			
Document Reference:	WTJ22-523 Northmead		
Contact	Asher Richardson		
Version and Date	Prepared by	Checked by	Approved by
Version No. 1 – 20/12/22	Asher Richardson Senior Town Planner	Andrew Cowan Director	Andrew Cowan Director
Version No. 2 – 26/04/23	Asher Richardson Senior Town Planner	Andrew Cowan Director	Andrew Cowan Director

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PART A PRELIMINARY

1.1 INTRODUCTION

This Clause 4.6 variation request (Variation Request) has been prepared in support of a Development Application (DA) for a multi-unit industrial warehouse and ancillary offices, storage premises, carparking and signage at 150-152 Briens Road, Northmead (the Site).

The Site is zoned Zone IN1 General Industrial pursuant to *Parramatta Local Environmental Plan 2011* (PLEP 2011) and is located within the City of Parramatta Local Government Area (LGA). The Proposal is permissible with consent within the IN1 zone and is considered contextually appropriate. The Proposal is generally consistent with the objectives and provisions of PLEP 2011, with the exception of Clause 4.3 – height of buildings, for which this Variation Request is sought, pursuant to Clause 4.6 – Exceptions to development standards of PLEP 2011.

The Proposal involves the construction and use of a multi-unit warehouse and ancillary offices, and storage premises. The Proposal comprises of the following key components:

- Construction and use of a new two storey plus basement industrial warehouse building comprising
  - Basement parking and storage premises
  - Seventeen (17) ground floor industrial warehouse units with mezzanine office spaces and associated parking; and
  - Seventeen (17) first floor industrial warehouse units with mezzanine office spaces and associated car parking
- Associated infrastructure services
- Associated vehicular access from Briens Road and car parking for 67 vehicles: and
- Provision for tree removal, landscaping, perimeter fencing, and signage throughout.

This Variation Request has been prepared in accordance with the objectives contained within Clause 4.6 and the relevant development standard prescribed under PLEP 2011. It considers various planning controls, strategic planning objectives and existing characteristics of the Site, and concludes that the Proposal, despite the non-compliance, is the best means of achieving the objectives of encouraging orderly development of the Site under the *Environmental Planning and Assessment Act 1979* (EP&A Act).

1.2 RATIONALE FOR VARIATION FROM DEVELOPMENT STANDARDS

This Variation Request has been submitted to assess the proposed variation from Clause 4.3 of PLEP 2011 and has been prepared in accordance with the requirements of Clause 4.6 of PLEP 2011 which includes the following objectives:

(a) to provide an appropriate degree of flexibility in applying certain development standards to particular development,
(b) to achieve better outcomes for and from development by allowing flexibility in particular circumstances.

Under the provisions of Clause 4.3 of PLEP 2011, the land is subject to a maximum height of buildings development standard of 12m, The Proposal entails the following key components identified in **TABLE 1** below.

TABLE 1: DEVELOPMENT COMPONENTS	
Project element	**Proposed**
Site Area	6,490sqm
Proposed maximum building height	14.59m
Proposed variation	2.59m or 21.5%

The Proposal principally involves the construction of a new warehouse development on the Site. The Proposal has a maximum building height of 12m. The Proposal therefore exceeds the development standard by 2.59m or 21.5%.

The proposed distribution of the built form and massing of the building across the Site is the result of existing topography of the Site as well as detailed analysis of the context of the Site and its surrounds with a desire to deliver a positive architectural outcome. The proposed design outcome is a significant improvement from the existing vacant Site as it is considered to be more aligned with the desired character of the immediate locality.

The particular circumstances of the Site and the Proposal warrant an appropriate degree of flexibility in the application of the development standard to achieve the best outcome for the Site.

1.3 DEVELOPMENT STANDARD VARIATION

Under the provisions of Clause 4.3 of PLEP 2011, the Site is subject to a maximum height of buildings control of 12m. The proposed height of buildings for the Site is outlined in **TABLE 2** below.

TABLE 2: CLAUSE 4.3 OF PLEP 2011 VARIATION SUMMARY		
PLEP 2011 Clause	**PLEP 2011 Development Standard**	**Proposed development**
Clause 4.3 - Height of buildings	Maximum Height: 12m	Proposed Height: 14.59m

Figure 1 and **Figure 2** below show the variation to the building height standard which, given the slop of the land, is inevitable. The area highlighted red in **Figure 1** shows the extent of the variation and how the variation increases with the fall of the land towards the rear. The presentation of the Proposal to Briens Road is now generally compliant with the maximum height development standard. Therefore, the Proposal is considered to provide an overall bulk and scale to Briens Road and the public domain that is consistent with the desired future character for the area as expressed by the key development controls applicable to the Site.

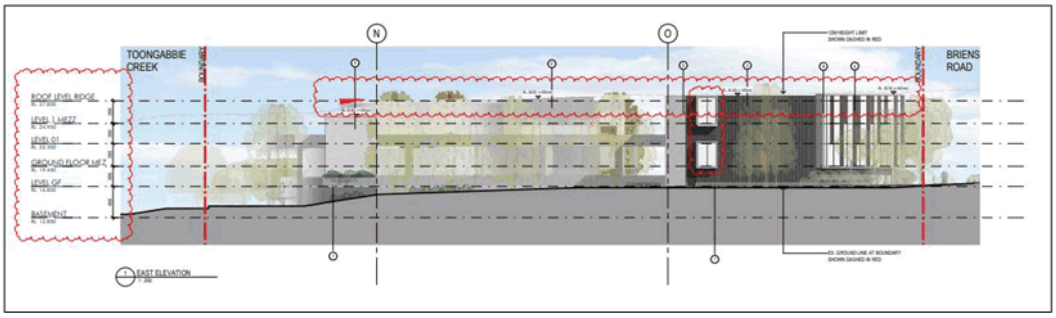


Figure 1. East Elevation showing extent of variation highlighted red (Source: WTP, 2022)

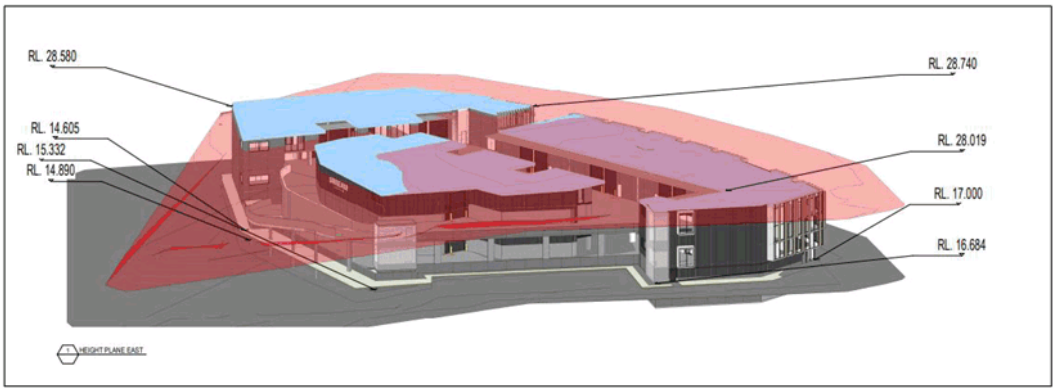


Figure 2. Height plan analysis showing extent of variation (Source: Nettleton Tribe Architects, 2022)

PART B THRESHOLDS THAT MUST BE MET

2.1 INTERPRETING CLAUSE 4.6

Clause 4.6 of PLEP 2011 facilitates exceptions to strict compliance with development standards in certain circumstances. Clause 4.6(3) states (our emphasis added):

> *Development consent must not be granted for development that contravenes a development standard unless the consent authority has considered* ***a written request*** *from the applicant that seeks to justify the contravention of the development standard by demonstrating:*
> *(a) that* ***compliance with the development standard is unreasonable or unnecessary*** *in the circumstances of the case, and*
> *(b) that there are* ***sufficient environmental planning grounds to justify contravening*** *the development standard.*

In addition, Clause 4.6(4) states that (our emphasis added):

> *Development consent must not be granted for development that contravenes a development standard unless:*
> *(a)* ***the consent authority is satisfied*** *that:*
> *(i)* ***the applicant's written request has adequately addressed the matters required to be demonstrated by subclause (3)****, and*
> *(ii) the proposed development will be* ***in the public interest because it is consistent with the objectives of the particular standard and the objectives for development within the zone*** *in which the development is proposed to be carried out, and*
> *(b) the* ***concurrence of the Secretary*** *has been obtained.*

Further to the above, Clause 4.6(5) states the following (our emphasis added):

> *In deciding whether to grant concurrence, the Planning Secretary must consider—*
> *(a) whether contravention of the development standard raises* ***any matter of significance for State or regional environmental planning****, and*
> *(b) the* ***public benefit of maintaining the development standard****, and*
> *(c) any other matters required to be taken into consideration by the Planning Secretary before granting concurrence.*

Accordingly, a successful Clause 4.6 variation must satisfy three limbs explained below:

First Limb – cl 4.6(4)(a)(i)

Clause 4.6(4)(a)(i) provides that the consent authority must be satisfied that the applicant's written request seeking to justify the contravention of the development standard has adequately addressed the matters required to be demonstrated by Clause 4.6(3). These are as follows:

a. that compliance with the development standard is unreasonable or unnecessary in the circumstances of the case (Cl 4.6(3)(a)); and

b. that there are sufficient environmental planning grounds to justify contravening the development standard (Cl 4.6(3)(b)). To this end the environmental planning grounds advanced in the written request must justify the contravention, not simply promote the benefits of carrying out the development as a whole: *Four2Five Pty Ltd v Ashfield Council* [2015] NSWCA 248 at [15].

In the decision of *Rebel MH v North Sydney Council* [2019] NSWCA 130 (**Rebel**) Payne JA held (our emphasis added):

> *"Although it was unnecessary finally to decide the correct construction of cl 4.6(4) in Al Maha, I agree with the construction advanced in that case by Basten JA, with whom Leeming JA agreed, at [21]-[24].* ***Properly construed, a consent authority has to be satisfied that an applicant's written request has in fact demonstrated the matters required to be demonstrated by cl 4.6(3).*** *Clause 4.6(3) requires the consent authority to have "considered" the written request and identifies the necessary evaluative elements to be satisfied. To comply with subcl (3), the request must demonstrate that compliance with the development standard is "unreasonable or unnecessary" and that "there are sufficient environmental planning grounds to justify" the contravention. It would give no work to subcl 4.6(4) simply to require the consent authority to be satisfied that an argument addressing the matters required to be addressed under subcl (3) has been advanced."*

Accordingly, the consent authority must be satisfied that this Variation Request demonstrates that both compliance is unreasonable or unnecessary in the circumstances of the case and sufficient environmental planning grounds exist to justify the breach of the height of buildings control by the Proposal.

The matters identified in the First Limb are addressed in **Sections 4.3**, **Section 4.4** and **Section 4.5** of this Variation Request.

Second Limb – clause 4.6(4)(a)(ii)

Clause 4.6(4)(a)(ii) provides that the consent authority must be satisfied that the Proposal will be in the public interest because it is consistent with:

a) the objectives of the particular development standard; and
b) the objectives for development within the zone in which the development is proposed to be carried out.

The matters identified in the Second Limb addressed in **Sections 4.1** and **Section 4.2** of this Variation Request.

Third Limb – clause 4.6(4)(b)

Clause 4.6(4)(b) requires that concurrence of the Secretary of the NSW Department of Planning, Industry and Environment has been obtained. Clause 4.6(5) outlines the matters to be considered by the Planning Secretary in deciding whether to grant concurrence.

The matters identified in the Third Limb are addressed in **Section 4.6** and **Section 4.7** of this Variation Request.

PART C STANDARDS BEING OBJECTED TO

3.1 OVERVIEW

The Site is zoned IN1 General Industrial and is subject to the underling objectives of the development standard.

3.2 CLAUSE 4.3 - HEIGHT OF BUILDINGS UNDER PLEP 2011

Clause 4.3 of PELP 2011 identifies the following objectives:

(1) The objectives of this clause are as follows—

(a) to nominate heights that will provide a transition in built form and land use intensity within the area covered by this Plan,

(b) to minimise visual impact, disruption of views, loss of privacy and loss of solar access to existing development,

(c) to require the height of future buildings to have regard to heritage sites and their settings

(d) to ensure the preservation of historic views,

(e) to reinforce and respect the existing character and scale of low density residential areas,

(f) to maintain satisfactory sky exposure and daylight to existing buildings within commercial centres, to the sides and rear of tower forms and to key areas of the public domain, including parks, streets and lanes.

Pursuant to Clause 4.6, the proposal seeks exception to the maximum permissible height of buildings control of 12m.

For clarity, building height is defined under the Dictionary accompanying PLEP 2011 as:

Building height *(or* ***height of building****) means—*

(a) in relation to the height of a building in metres—the vertical distance from ground level (existing) to the highest point of the building, or

(b) in relation to the RL of a building—the vertical distance from the Australian Height Datum to the highest point of the building,

including plant and lift overruns, but excluding communication devices, antennae, satellite dishes, masts, flagpoles, chimneys, flues and the like.

PART D PROPOSED VARIATION TO STANDARDS IN CLAUSE 4.3 of PLEP 2011

Clause 4.6(4)(a)(ii) requires that a request to vary a development standard must establish that the Proposal will be in the public interest because it is consistent with the objectives of the development standard and the zone. *Initial Action Pty Ltd v Woollahra Municipal Council* [2018] NSWLEC 118 at 27

Importantly, the word consistent has been interpreted as 'compatible' or 'capable of existing in harmony'. *Kingsland Developments Australia Pty Ltd City of Parramatta Council* [2018] NSWLEC 1241 at 20.

4.1 OBJECTIVES OF THE STANDARD

A key determinant of the appropriateness of a Clause 4.6 Variation to a development standard is the proposal's compliance with the underlying objectives and purpose of that development standard.

Clause 4.3 of PLEP 2011 sets out specific objectives. Those objectives under PLEP 2011 are responded to in **TABLE 3** below.

TABLE 3: CONSISTENCY WITH THE CLAUSE 4.3 OBJECTIVES

Objective	Response
(a) to nominate heights that will provide a transition in built form and land use intensity within the area covered by this Plan,	The height of the Proposal reflects the locality and provides an appropriate transition in built form and land use intensity within the area. The Proposal is compatible with the surrounding area and adjoining similar industrial developments. The Proposal has been configured with respect to the surrounding industrial and warehouse properties and the existing and desired character of the area through a sophisticated and modern warehouse development. The proposed building bulk and scale would not cause any undesirable visual impact, view obstruction, privacy intrusion or loss of solar access owing to the provision of adequate setbacks, building separation and deep-soil landscaping It is considered that the Proposal will result in an improvement to the existing Site and contribute positively to the Northmead industrial precinct. The Proposal will create visual interest and positive aesthetics which will contribute to the streetscape. Further to this, the Proposal delivers a high-quality urban design outcome through the façade articulation. Whilst it is acknowledged that the Proposal would result in maximum height above that permitted on the Site, this is typical of the urban industrial setting and seeks to provide a development

TABLE 3: CONSISTENCY WITH THE CLAUSE 4.3 OBJECTIVES

Objective	Response
	that responds to the topography and context in which the Site is located. As illustrated in **Figure 3** below, the Proposal is located in an area with a height of buildings standard of 12m to the south, north and east. **Figure 3. Height of Buildings Map** (NSW Legislation, 2022) Notwithstanding this, ground-truthing at the Site notes that there are a number of larger warehouse developments located to the east of the Site along Briens Road, and large mixed-use developments to the south along Mons Road that exceed the 12m standard. The below examples provide some context to the built form within the immediate area. ▪ At 104-128 Briens Road to the east of the Site, the Coca-Cola Site contains a number of large warehouse and silo buildings. The silo building approved under Determination No. DA/454/2020 has a height of **21.4 metres** (to RL 36.6 as shown on approved plans) and was approved with a Clause 4.6 variation request. ▪ Another single storey warehouse on the Coca Cola Site has a height of **31 metres** (to RL 46.8 as shown on survey).

TABLE 3: CONSISTENCY WITH THE CLAUSE 4.3 OBJECTIVES

Objective	Response
	▪ To the south of the Site fronting Mons Road, a number of large mixed-use developments range in height from **15 metres** (5 storeys) to **21 metres** (7 storeys at 32-34 Mons Road). The Proposal has a maximum building height of 14.59 metres in the south-western corner of the Site and given the topography, drops down to 12m at the Briens Road frontage, being that frontage of the Site most visible from the public domain. Given the 9.5 metre height limit for the low density residential zoned land to the west and north-west of the Site, and the existing 15 to 21 metre developments to the south, and 21 to 31 metre developments to the east, the proposed 14.59m high Proposal presents an appropriate transition in built form within the area.
(b) to minimise visual impact, disruption of views, loss of privacy and loss of solar access to existing development,	The Proposal does not result in any impact on existing development in the vicinity of the Site by way of visual impact, disruption of view, loss of privacy and loss of solar access. The Proposal is adjoined to the north and east by similar-scaled industrial development and given the buffer provided by Briens Road and Mons Road, the Site will not impact on the existing developments to the north, east and west by way of visual impact, disruption of view, loss of privacy and loss of solar access. The nearest residential properties are located 100m to the south of the Site fronting Mons Road and 150m to the south-west of the Site fronting Briens Road. The Site is sufficiently distanced from those sensitive receivers so as to not create any negative impact on the amenity enjoyed by those occupants.
(c) to require future buildings to have regard to heritage sites and their settings	The Site is not located near any heritage sites. Therefore, this objective is not applicable to the Site.
(d) to ensure the preservation of historic views,	The Site is not located near any historic views. Therefore, this objective is not applicable to the Site.
(e) to reinforce and respect the existing character and scale of low density residential areas,	The Site is not located in a low density residential area and the nearest low density residential area is located approximately 150m to the south west of the Site on the other side of

TABLE 3: CONSISTENCY WITH THE CLAUSE 4.3 OBJECTIVES	
Objective	Response
	Toongabbie Creek. Notwithstanding, the Proposal will not negatively impact on the character and scale of those low density residential areas.
(f) to maintain satisfactory sky exposure and daylight to existing buildings within commercial centres, to the sides and rear of tower forms and to key areas of the public domain, including parks, streets and lanes.	The Site is not located near any commercial centres. Therefore, this objective is not applicable to the Site.

The Site is zoned IN1 General Industrial pursuant to PLEP 2011. Therefore, consideration has been given to the zone objectives in **TABLE 4** below:

TABLE 4: CONSISTENCY WITH THE IN1 GENERAL INDUSTRIAL ZONE OBJECTIVES	
Objective	Response
To provide a wide range of industrial, warehouse land uses.	The Proposal involves the construction of flexible industrial tenancies that are capable of providing a range of light industrial, warehouse, storage and related land uses. The use of the Site is permitted with consent under the zoning.
To encourage employment opportunities	The Proposal will provide significant employment opportunities to the immediate community and wider locality within the Parramatta LGA during the construction and operational phases of the development, as well as contribute to viable economic return to the local and regional economies. The redevelopment of what is currently an underutilised site and construction of new industrial development will provide greater flexibility in the tenancy offerings at the Site and encourage a variety of land uses to support the locality, whilst providing an improved aesthetic on the Site. The exceedance is also consistent with this objective. The variation effectively provides for additional GFA to support a variety of tenancy sizes and configurations on the Site and, in doing so, encourages employment opportunities.
To minimise any adverse effect of industry on other land uses.	The Proposal and the exceedance does not result in any additional or unacceptable impact on other land uses. The Proposal is not readily visible from any residential-zoned land or other sensitive receiver and therefore does not result in any unreasonable bulk and scale impacts.

TABLE 4: CONSISTENCY WITH THE IN1 GENERAL INDUSTRIAL ZONE OBJECTIVES	
Objective	Response
	In addition, the nature of operations associated with future tenancies would have no direct adverse impact on any surrounding land uses given: ▪ Sufficient parking is provided on Site. ▪ The road network would continue to operate a satisfactory level of service in the AM and PM peak periods. ▪ Noise and air impacts would comply with EPA requirements. ▪ The bulk and scale of the development would not overshadow or adversely affect amenity of surrounding industrial properties. ▪ The development provides onsite stormwater management outcomes which would not adversely affect other surrounding land uses. ▪ The extent of landscaping proposed provides a visual buffer to ameliorate the appearance of the building when viewed from other properties. ▪ All development will be wholly contained within the Site and will not interfere with the operation of surrounding land uses.
To facilitate a range of non-industrial land uses that serve the needs of workers and visitors.	It is understood that "other land uses" relates to other permissible uses in the zone that are not industrial in nature, such as take away food and drink premises. The Proposal is not inconsistent with this objective.

In light of the above, the Proposal, including the exceedance, is consistent with three of the zone objectives and neutral with respect to one.

4.2 ESTABLISHING IF THE DEVELOPMENT STANDARD IS UNREASONABLE OR UNNECESSARY

Subclause 4.6(3)(a) and the judgement in *Four2Five Pty Ltd v Ashfield Council* (refer to **Section 2.1**) emphasise the need for the proponent to demonstrate how the relevant development standard is unreasonable or unnecessary in the circumstances.

In view of the unique circumstances of the Site and absence of any discernible impact to the public domain, strict compliance with Clause 4.3 of PLEP 2011 is considered to be both unnecessary and unreasonable.

The case of *Wehbe v Pittwater Council* [2007] NSWLEC 827 sets out five ways in which numerical compliance with a development standard might be considered unreasonable or unnecessary as follows:

- The objectives of the standard are achieved notwithstanding the non-compliance with the standard
- The underlying objective or purpose of the standard is not relevant to the development and therefore compliance is unnecessary

- The underlying objective or purpose would be defeated or thwarted if compliance was required and therefore compliance is unreasonable
- The development standard has been virtually abandoned or destroyed by the Council's own actions in granting consents departing from the standard and hence compliance with the standard is unnecessary and unreasonable; and/or
- The zoning of the particular land is unreasonable or inappropriate so that a development standard appropriate for that zoning is also unreasonable or unnecessary. That is, the particular parcel of land should not have been included in the particular zone.

Set out above is a detailed assessment against the objectives of the development standard and adopted the first test in *Wehbe* to establish that compliance is unreasonable or unnecessary because the objectives of the height of buildings standard are satisfied notwithstanding the variation.

We have set out above a detailed assessment against the objectives of the development standard and adopted the first test and fourth test in *Wehbe*. The first and fourth tests are used herein to establish that compliance is unreasonable or unnecessary because the objectives of the height development standard are satisfied notwithstanding the variation, and the development standard has been virtually abandoned or destroyed by the Council's own actions in granting consents departing from the standard.

- The Proposal is consistent with the existing and desired future character of the Site and locality and the surrounding area in that it provides for a scale of development that when viewed from the streetscape and surrounding properties is not dominant in terms of bulk, scale, extent of hardstand or interface with the streetscape. It is argued that the Proposal provides a development outcome that, in replacing the existing underutilised vacant Site, improves the character of the area.

- It is considered that the height of buildings development standard has been virtually abandoned or destroyed by the Council's own actions in granting consents departing from the standard. The below examples provide some context to the built form within the immediate area and provide examples of variations to the height of buildings development standard approved by Council. These examples share the 12m height development standard applicable to the Site, and are located on adjoining sites in immediate proximity to the Site:
    - At 104-128 Briens Road to the east of the Site, the Coca-Cola Site contains a number of large warehouse and silo buildings. The silo building approved under Determination No. DA/454/2020 has a height of **21.4 metres** (to RL 36.6 as shown on approved plans) and was approved with a Clause 4.6 variation request by Council (see **Figure 4** below).
    - Another single storey warehouse on the Coca Cola Site has a height of **31 metres** (to RL 46.8 as shown on survey) (see **Figure 5** below).
    - To the south of the Site fronting Mons Road, a number of large mixed-use developments range in height from **15 metres** (5 storeys) to **21 metres** (7 storeys at 32-34 Mons Road) (see **Figure 6** below).
    - A review of City of Parramatta Council's Development Application Variations Register indicates a number of Sites within close proximity to the Site that exceed the 12m height standard and were approved by Council, notwithstanding the variation.

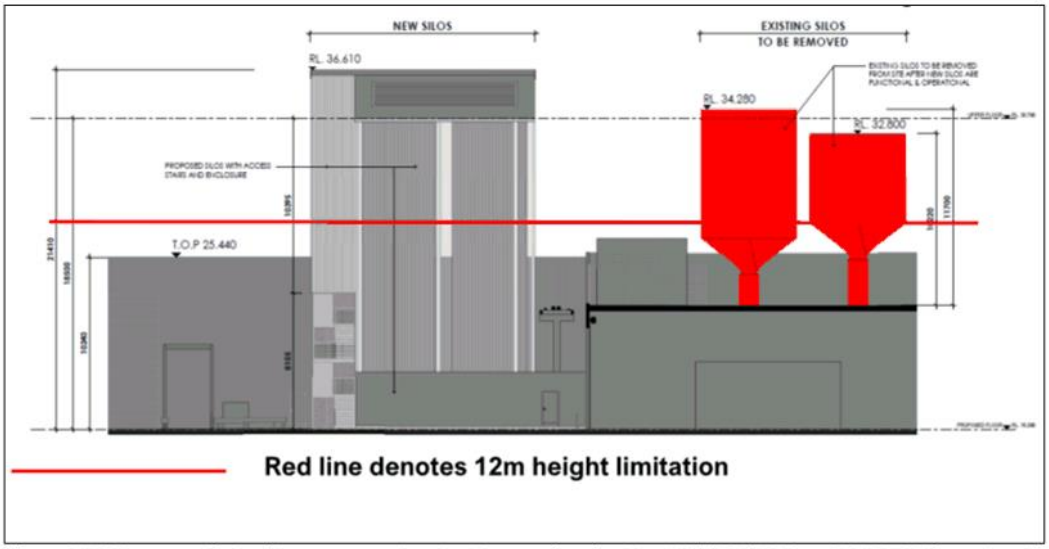


Figure 4. 21.4 metre high silos approved under Determination No. DA/454/2020 at 104-108 Briens Road

Figure 5. 31 metre high warehouse building at 104-108 Briens Road (Source: Google, 2022)

Figure 6. 21 metre high (7 storeys) mixed-use development at 32-34 Mons Road (Source: Google, 2022)

- The presentation of the Proposal to the public domain is now generally compliant with the maximum height development standard. Therefore, the Proposal is considered to provide an overall bulk and scale to Briens Road and the public domain that is consistent with the desired future character for the area as expressed by the key development controls applicable to the Site.

- The maximum variation to the development standard of 14.59 metres is located at the rear (south) of the Site due to the natural topography of the Site. The Site falls some 2.2 metres from north to south and given the nature of the use it is not practicable to step the building to follow that fall. Notwithstanding, this part of the Site is not readily visible from any road frontage of the Site and does not contribute to the streetscape presentation of the building.

- It is noted that the Proposal and the exceedance does not result in any additional or unacceptable impact on other land uses by way of visual impact, disruption of views, loss of privacy, loss of solar access, traffic impact or loss of on-street parking capacity of the like, and the Proposal is not readily visible from any residential-zoned land or other sensitive receiver. Therefore, the Proposal does not result in any unreasonable impacts on adjoining development.

In view of the circumstances of the Proposal, strict compliance with clause 4.3 of PLEP 2011 is considered to be both unnecessary and unreasonable. The Proposal does not conflict with the intent of Clause 4.3 of PLEP 2011 as demonstrated above and satisfies its objectives, notwithstanding the proposed numerical variation.

The proposed height variation will retain compatibility with surrounding development and continue to support a wide range of industrial and warehouse land uses in the locality, consistent with the objectives of the IN1 General Industrial zone.

The abovementioned justifications are considered valid, and in this instance the Clause 4.6 Variation is considered to be acceptable. The Proposal represents a more efficient use of the Site. The objectives of the relevant clause and IN1 General Industrial zone would be upheld as a result of the Proposal.

4.3 SUFFICIENT ENVIRONMENTAL PLANNING GROUNDS TO JUSTIFY CONTRAVENING THE DEVELOPMENT STANDARD

The Variation Request is considered well founded because, notwithstanding the proposed non-compliance with the maximum permitted building height:

- The proposed building height variation is consistent with the underlying objective or purpose of the standard as demonstrated in **Section 4.1**.
- The proposed building height variation is consistent with the objectives of the IN1 General Industrial zone as described in **Section 4.2**.
- Compliance with the standard would be unreasonable and unnecessary for the reasons outlined in **Section 4.3**.
- The additional building height beyond the 12m prescribed under Clause 4.3 does not cause any impact on existing development in the vicinity of the Site by way of visual impact, disruption of view, loss of privacy and loss of solar access.
- The Proposal provides compliant setbacks to boundaries and landscaping zones that provide separation and screening of the built form. The proposed landscaped building setback of 4.5 metres across the entire Briens Road frontage of the Site and ameliorates the visual impacts associated with the new built form.
- The Proposal ultimately seeks to facilitate construction and operation of a new industrial development. The proposed internal building height is considered a key attribute in creating an internal building environment that would ensure the delivery of industrial warehouse facilities required to support the operations of the future tenants involved and thereby enabling the productive use of the Site.
- The Proposal has been architecturally designed to provide a materiality and form that sets a desirable precedent for future development and ensures that the visual impact of the building integrates with the surrounding environment.

- The proposed volumetric outcome is representative of market needs and demands for modernised industrial warehouse and industrial facilities to ensure that products can be stored internal to the building and minimises external exposure.

- The Proposal has been architecturally designed to provide a materiality and form that sets a desirable precedent for future development and ensures that the visual impact of the building integrates with the surrounding environment.

- It is demonstrated that subject to the implementation of the design recommendations, the proposed building footprint would have no adverse or non-compliant acoustic outcomes on any nearby residential, industrial or commercial receivers during daytime, evening or night-time periods.

- The Proposal would remain compatible with Industrial land uses in light of the above.

- Compliance with the remaining development standards applicable to the site is achieved. There would be no measurable environmental or amenity benefits in maintaining the standard nor would this support the provision of warehouse and other light industrial uses which caters to the operational needs of the end users and the market needs of the industry.

For the reasons outlined above, it is considered that the variation to the height of buildings control under Clause 4.3 is appropriate and can be clearly justified having regard to the matters listed within clause 4.6(3)(b) under PLEP 2011.

4.4 PUBLIC INTEREST

Clause 4.6(4)(a)(ii) requires the proposal to be in the public interest because it is consistent with the objectives of the particular standard and the objectives for development within the zone in which the development is proposed to be carried out.

Section 4.3 and **Section 4.4** above demonstrate how the Proposal will be in the public interest because it is consistent with the objectives of the particular standard and the objectives for development within the zone in which the development is proposed to be carried out.

In Lane Cove Council v Orca Partners Management Pty Ltd (No 2) [2015] NSWLEC 52, Sheahan J referred to the question of public interest with respect to planning matters as a consideration of whether the public advantages of the proposed development outweigh the public disadvantages of the proposed development.

The Proposal provides the following public benefits:

- Maintains the prevailing character of the area;
- Supports industrial uses within the IN1 General Industrial zone; and
- Facilitates modern and efficient industrial warehouse tenancy spaces.

There are no identifiable public disadvantages which will result from the Proposal in terms of amenity impacts on adjoining uses and streetscape or environmental impacts on the locality. The Proposal is therefore considered to be in the public interest.

4.5 MATTERS OF STATE AND REGIONAL SIGNIFICANCE

The non-compliance with Clause 4.3 of PLEP 2011 does not give rise to any matters of significance for the State or regional environmental planning. The non-compliance does also not conflict with any State Environmental Planning Policies or Ministerial Directives under section 9.1 of the EP&A Act.

Planning Circular PS 20-002, dated 5 May 2020, prescribes that all consent authorities may assume concurrence of the Secretary of the Department of Planning and Environment where it is required under Clause 4.6 of a Local Environmental Plan, unless the development contravenes a numerical development standard by more than 10%. The Proposal contravenes the height of buildings development standard by more than 10% and therefore the concurrence of the Secretary is not assumed.

4.6 PUBLIC BENEFIT IN MAINTAINING THE STANDARD

Strict compliance with Clause 4.3 of PLEP 2011 will result in:

- Undermine the functionality of the development and hinder the efficient use of the development which is an employment-generating development in the City of Parramatta LGA.
- Not meet the operational requirements of modern industrial development. This is evident in the height of buildings controls prescribed by the environmental planning instruments in other LGAs where there is no height of buildings limit prescribed for industrial zoned land, acknowledging the low-impact siting of industrial lands.

Further to the above, in the event the development standard was maintained, the resulting benefits to the adjoining properties and wider public would be nominal. It is noted that strict compliance with clause 4.3 would inhibit the development from operating at its full capacity, by not facilitating the operational requirements of the end users, which would ultimately impact on the future industrial and warehouse land uses on the Site. As such, it has been demonstrated that the additional building height is reasonable and necessary for the proposed warehouse development, which will support industrial land uses in the City of Parramatta LGA.

Accordingly, there is no genuine or identifiable public benefit in maintaining this strict building height control in the context of the Proposal.

4.7 OBJECTIVES OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

All planning determinations made under the EP&A Act are required to be made with regard to the objects of the Act in accordance with section 1.3 of the EP&A Act. **TABLE 5** below assesses the Proposal against the objects of the EP&A Act.

TABLE 5: EP&A ACT OBJECTIVES

Objective	Response
(a) to promote the social and economic welfare of the community and a better environment by the proper management, development and	The Proposal is considered to be in the public interest as it would contribute towards meeting the demand for increased employment opportunities

conservation of the State's natural and other resources,	and promote the economic welfare of the Parramatta LGA, as identified in *A Metropolis of Three Cities*. Additionally, the Proposal would be of social benefit as it would provide employment-generating opportunities for the immediate locality.
(b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment,	The Proposal promotes the principles of ecologically sustainable development (ESD) by achieving reductions in potable water import by capturing rainwater on Site and reusing this for non-potable uses, achieves pollution reduction targets, and employs OSD for the control of stormwater discharge from the Site Measures such as erosion and sediment control, and planting of native vegetation will further contribute to ESD.
(c) to promote the orderly and economic use and development of land,	The Proposal revitalises a Site that is underutilised and unable to accommodate employment densities envisaged under the IN1 zone. The provision of the built form proposed achieves a balanced outcome with respect to achieving the floor space density required for the Site to successfully operate whilst ensuring acceptable environmental impacts in terms of: ▪ visual amenity ▪ noise ▪ traffic generation ▪ stormwater management The Proposal therefore accords with this objective.
(d) to promote the delivery and maintenance of affordable housing,	The Proposal will not negatively impact the delivery and maintenance of affordable housing.
(e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats,	The Proposal would not create the risk of serious or irreversible damage to the environment. Ultimately, the Proposal would not create any threats of serious or irreversible environmental damage which would require further scientific study to fully ascertain. The Proposal would not impact on the conservation of biological diversity or the ecological integrity of the locality.

(f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),	The Proposal is not located nearby any item of heritage significance.
(g) to promote good design and amenity of the built environment,	The Proposal promotes good design and amenity of the built environment by providing an outcome that achieves a balanced landscaped setting on the site that integrates with the contemporary yet highly functional building to accommodate a range of uses. The Proposal sets a desirable precedent through materiality, modulation, suitable setbacks, landscaping and provision of suitable onsite car parking.
(h) to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants,	The Proposal can be constructed and maintained without health and safety risks to future tenants.
(i) to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State,	The Proposal is considered to be local development, for which the Consent Authority will be City of Parramatta Council.
(j) to provide increased opportunity for community participation in environmental planning and assessment.	The DA is subject to the relevant public notification requirements.

4.8 SUMMARY

For the reasons outlined above, it is considered that the variation to Clause 4.3 of PLEP 2011 is well-founded and appropriate in the circumstances. Furthermore, the Variation Request is considered to be well-founded for the following reasons as outlined in Clause 4.6 of PLEP 2011 and relevant case law:

- Compliance with the development standard is unreasonable and unnecessary in the circumstances (refer to **Section 4.3** as part of the First Limb satisfied);
- There are sufficient environmental planning grounds to justify contravening the development standard (refer to **Section 4** as part of the First Limb satisfied);
- The Proposal is in the public interest because it is consistent with the objectives of the particular standard and the objectives for development within the zone in *which the development is proposed to be carried out* (refer to **Section 4.5** as part of the Second Limb satisfied);
- The Proposal is consistent with the objectives of the particular standard and the objectives of the standard are achieved notwithstanding the non-compliance with the standard.(refer to **Section 4.1** as part of the Second Limb satisfied);
- The Proposal is consistent with the objectives for development within the zone and long term strategic intentions to provide employment generating land use (refer to **Section 4.2** as part of the Second Limb satisfied);
- The Proposal does not give rise to any matter of significance for the State or regional environmental planning and is consistent with the visions and objectives of the relevant strategic plans (refer to **Section 4.6** as part of the Third Limb satisfied);
- The public benefit in maintaining strict compliance with the development standard would be negligible (refer to **Section 4.7** as part of the Third Limb satisfied); and
- The Proposal is consistent with the objectives of the *Environmental Planning and Assessment Act 1979* (refer to **Section 8).**

Overall, it is considered that the variation to the height of buildings development standard is appropriate and is justified having regard to the matters listed within Clause 4.6 of PLEP 2011.

PART E CONCLUSION

For the reasons outlined above, it is requested that Council support the Variation Request, which seeks approval for non-compliance with Clause 4.3 of PLEP 2011 for the following reasons:

- Compliance with the development standard is unreasonable and unnecessary in the circumstances of the case;
- There are sufficient environmental planning grounds to justify contravening the development standards;
- The Proposal will capitalise on the Site's full planning potential;
- The Proposal satisfies the objectives of the IN1 General Industrial zone and Clause 4.3 of PLEP 2011; and
- There is no public benefit in maintaining strict compliance with the standards.

Council should be satisfied that the Variation Request has addressed and meets the requirements of Clause 4.6 of PLEP 20112 and should be favourably considered by Council.

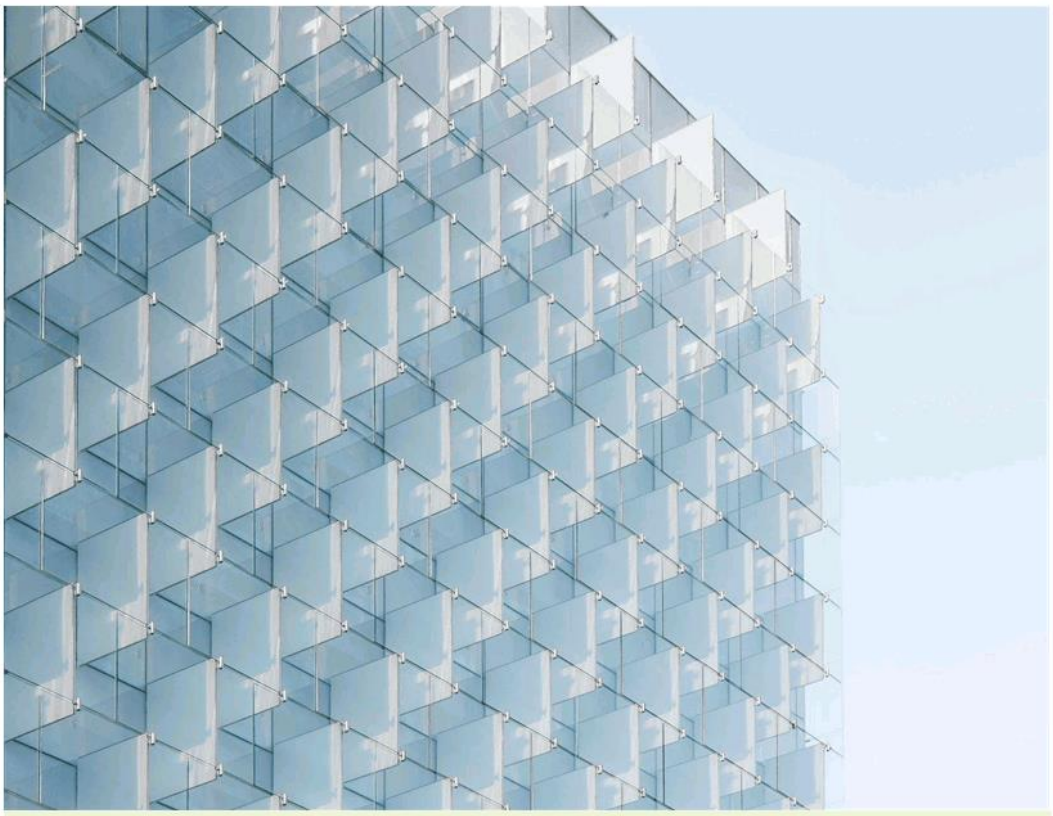
Attachment B

Applicant Clause 4.6 Variation - FSR

WILLOWTREE PLANNING

9 August 2023

Ref: WTJ22-523
Contact: Asher Richardson



CLAUSE 4.6 VARIATION REQUEST
FLOOR SPACE RATIO (FSR)

CONSTRUCTION AND USE OF MULTI-UNIT INDUSTRIALWAREHOUSE AND ANCILLARY OFFICES, STORAGE PREMISES, CARPARKING & SIGNAGE

150-152 BRIENS ROAD, NORTHMEAD
(Lot 111 DP 1160038)

Prepared by Willowtree Planning Pty Ltd
on behalf of Hannas Group

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SYDNEY I NEWCASTLE I GOLD COAST I BRISBANE

Clause 4.6 Variation Request
and storage premises, carparking & signage
150-152 Briens Road, Northmead (Lot 111 DP 1160038)

In the spirit of reconciliation and recognition, Willowtree Planning acknowledges the Traditional Owners of this Country throughout Australia and their continuing and ongoing connections to land, waters and community. We show our respect to Elders – past and present. We acknowledge that we stand on this Country which was and always will be recognised as Aboriginal Land. We acknowledge the Traditional Owners of the Lands in this Local Government Area, belonging to the local Aboriginal People, where this proposal is located upon.

DOCUMENT CONTROL TABLE			
Document Reference:	WTJ22-523 Northmead		
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Version and Date	Prepared by	Checked by	Approved by
Version No. 1 – 20/12/22	Asher Richardson Senior Town Planner	Andrew Cowan Director	Andrew Cowan Director
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PART A PRELIMINARY

1.1 INTRODUCTION

This Clause 4.6 variation request (Variation Request) has been prepared in support of a Development Application (DA) for a multi-unit industrial warehouse and ancillary offices, storage premises, carparking and signage at 150-152 Briens Road, Northmead (the Site).

The Site is zoned Zone IN1 General Industrial pursuant to *Parramatta Local Environmental Plan 2011* (PLEP 2011) and is located within the City of Parramatta Local Government Area (LGA). The Proposal is permissible with consent within the IN1 zone and is considered contextually appropriate. The Proposal is generally consistent with the objectives and provisions of PLEP 2011, with the exception of Clause 4.4 – Floor Space Ratio (FSR), for which this Variation Request is sought, pursuant to Clause 4.6 – Exceptions to development standards of PLEP 2011.

The Proposal involves the construction and use of a multi-unit warehouse and ancillary offices, and storage premises. The Proposal comprises of the following key components:

- Construction and use of a new two storey plus basement industrial warehouse building comprising
  - Basement parking and storage premises
  - Seventeen (17) ground floor industrial warehouse units with mezzanine office spaces and associated parking; and
  - Seventeen (17) first floor industrial warehouse units with mezzanine office spaces and associated car parking
- Associated infrastructure services
- Associated vehicular access from Briens Road and car parking for 67 vehicles: and
- Provision for tree removal, landscaping, perimeter fencing, and signage throughout.

This Variation Request has been prepared in accordance with the objectives contained within Clause 4.6 and the relevant development standard prescribed under PLEP 2011. It considers various planning controls, strategic planning objectives and existing characteristics of the Site, and concludes that the Proposal, despite the non-compliance, is the best means of achieving the objectives of encouraging orderly development of the Site under the *Environmental Planning and Assessment Act 1979* (EP&A Act).

1.2 RATIONALE FOR VARIATION FROM DEVELOPMENT STANDARDS

This Variation Request has been submitted to assess the proposed variation from Clause 4.4 of PLEP 2011 and has been prepared in accordance with the requirements of Clause 4.6 of PLEP 2011 which includes the following objectives:

(a) to provide an appropriate degree of flexibility in applying certain development standards to particular development,
(b) to achieve better outcomes for and from development by allowing flexibility in particular circumstances.

Under the provisions of Clause 4.4 of PLEP 2011, the land is subject to a maximum FSR development standard of 1:1. The Proposal entails the following key components identified in **TABLE 1** below.

TABLE 1: DEVELOPMENT COMPONENTS

Project element	Proposed
Site Area	6,490sqm
Proposed Warehouse GFA (including offices and Lobby)	6,181sqm
Proposed storage GFA (not technically basement)	476sqm
Total proposed GFA	6,657sqm

The Proposal principally involves the construction of a new warehouse development on the Site. The Proposal has a gross floor area (GFA) of 6,657sqm on the 6,490sqm Site, resulting in an FSR of 1.02:1. The Proposal therefore exceeds the development standard by 167sqm or 2.5%

The Proposal seeks to take advantage of the unique characteristics of the Site to provide basement self-storage as part of the development. The minor variation to FSR development standard of 167sqm (2.5%) can be entirely attributed to the small portion of storage in the basement level that is not technically consistent with the definition of a basement, given the steep topography of the Site. Excluding the 476sqm of storage in the basement level that technically constitutes GFA, the Proposal would be compliant with the FSR development standard. The overall variation to the FSR standard is 167sqm which is entirely located below ground floor level and does not result in bulk that is visible from the public domain.

The particular circumstances of the Site and the Proposal warrant an appropriate degree of flexibility in the application of the development standard to achieve the best outcome for the Site.

1.3 DEVELOPMENT STANDARD VARIATION

Under the provisions of Clause 4.4 of PLEP 2011, the Site is subject to a maximum FSR control of 1:1. The proposed FSR for the Site is outlined in **TABLE 2** below.

TABLE 2: CLAUSE 4.4 OF PLEP 2011 VARIATION SUMMARY	
PLEP 2011 Clause	**PLEP 2011 Development Standard**
Clause 4.4 – Floor Space Ratio	Maximum FSR 1:1
Site area	6,490sqm
Proposed gross floor area (GFA)	6,657sqm
Proposed FSR	1.02:1
Proposed FSR variation	167sqm or 2.5%

PART B THRESHOLDS THAT MUST BE MET

2.1 INTERPRETING CLAUSE 4.6

Clause 4.6 of PLEP 2011 facilitates exceptions to strict compliance with development standards in certain circumstances. Clause 4.6(3) states (our emphasis added):

> *Development consent must not be granted for development that contravenes a development standard unless the consent authority has considered* ***a written request*** *from the applicant that seeks to justify the contravention of the development standard by demonstrating:*
>
> *(a) that* ***compliance with the development standard is unreasonable or unnecessary*** *in the circumstances of the case, and*
>
> *(b) that there are* ***sufficient environmental planning grounds to justify contravening*** *the development standard.*

In addition, Clause 4.6(4) states that (our emphasis added):

> *Development consent must not be granted for development that contravenes a development standard unless:*
>
> *(a)* ***the consent authority is satisfied*** *that:*
>
> *(i)* ***the applicant's written request has adequately addressed the matters required to be demonstrated by subclause (3)****, and*
>
> *(ii) the proposed development will be* ***in the public interest because it is consistent with the objectives of the particular standard and the objectives for development within the zone*** *in which the development is proposed to be carried out, and*
>
> *(b) the* ***concurrence of the Secretary*** *has been obtained.*

Further to the above, Clause 4.6(5) states the following (our emphasis added):

In deciding whether to grant concurrence, the Planning Secretary must consider—

*(a) whether contravention of the development standard raises **any matter of significance for State or regional environmental planning**, and*

*(b) the **public benefit of maintaining the development standard**, and*

(c) any other matters required to be taken into consideration by the Planning Secretary before granting concurrence.

Accordingly, a successful Clause 4.6 variation must satisfy three limbs explained below:

First Limb – cl 4.6(4)(a)(i)

Clause 4.6(4)(a)(i) provides that the consent authority must be satisfied that the applicant's written request seeking to justify the contravention of the development standard has adequately addressed the matters required to be demonstrated by Clause 4.6(3).

These are as follows:

a. that compliance with the development standard is unreasonable or unnecessary in the circumstances of the case (Cl 4.6(3)(a)); and
b. that there are sufficient environmental planning grounds to justify contravening the development standard (Cl 4.6(3)(b)). To this end the environmental planning grounds advanced in the written request must justify the contravention, not simply promote the benefits of carrying out the development as a whole: *Four2Five Pty Ltd v Ashfield Council* [2015] NSWCA 248 at [15].

In the decision of *Rebel MH v North Sydney Council* [2019] NSWCA 130 (**Rebel**) Payne JA held (our emphasis added):

*"Although it was unnecessary finally to decide the correct construction of cl 4.6(4) in Al Maha, I agree with the construction advanced in that case by Basten JA, with whom Leeming JA agreed, at [21]-[24]. **Properly construed, a consent authority has to be satisfied that an applicant's written request has in fact demonstrated the matters required to be demonstrated by cl 4.6(3).** Clause 4.6(3) requires the consent authority to have "considered" the written request and identifies the necessary evaluative elements to be satisfied. To comply with subcl (3), the request must demonstrate that compliance with the development standard is "unreasonable or unnecessary" and that "there are sufficient environmental planning grounds to justify" the contravention. It would give no work to subcl 4.6(4) simply to require the consent authority to be satisfied that an argument addressing the matters required to be addressed under subcl (3) has been advanced."*

Accordingly, the consent authority must be satisfied that this Variation Request demonstrates that both compliance is unreasonable or unnecessary in the circumstances of the case and sufficient environmental planning grounds exist to justify the breach of the FSR control by the Proposal.

The matters identified in the First Limb are addressed in **Sections 4.3**, **Section 4.4** and **Section 4.5** of this Variation Request.

Second Limb – clause 4.6(4)(a)(ii)

Clause 4.6(4)(a)(ii) provides that the consent authority must be satisfied that the Proposal will be in the public interest because it is consistent with:

a) the objectives of the particular development standard; and
b) the objectives for development within the zone in which the development is proposed to be carried out.

The matters identified in the Second Limb addressed in **Sections 4.1** and **Section 4.2** of this Variation Request.

Third Limb – clause 4.6(4)(b)

Clause 4.6(4)(b) requires that concurrence of the Secretary of the NSW Department of Planning, Industry and Environment has been obtained.

Clause 4.6(5) outlines the matters to be considered by the Planning Secretary in deciding whether to grant concurrence.

The matters identified in the Third Limb are addressed in **Section 4.6** and **Section 4.7** of this Variation Request.

PART C STANDARDS BEING OBJECTED TO

3.1 OVERVIEW

The Site is zoned IN1 General Industrial and is subject to the underling objectives of the development standard.

3.2 CLAUSE 4.4 – FSR UNDER PLEP 2011

Clause 4.4 of PELP 2011 identifies the following objectives:

(1) The objectives of this clause are as follows—

(a) to regulate density of development and generation of vehicular and pedestrian traffic,

(b) to provide a transition in built form and land use intensity within the area covered by this Plan,

(c) to require the bulk and scale of future buildings to have regard to heritage sites and their settings,

(d) to reinforce and respect the existing character and scale of low density residential areas.

Pursuant to Clause 4.6, the proposal seeks exception to the maximum permissible FSR control of 1:1.

For clarity FSR is defined under Clause 4.5 of the PLEP 2011 as:

(2) Definition of "floor space ratio" The floor space ratio of buildings on a site is the ratio of the gross floor area of all buildings within the site to the site area.

(3) ***Site area*** *In determining the site area of proposed development for the purpose of applying a floor space ratio, the* ***site area*** *is taken to be—*

(a) if the proposed development is to be carried out on only one lot, the area of that lot, or

(b) if the proposed development is to be carried out on 2 or more lots, the area of any lot on which the development is proposed to be carried out that has at least one common boundary with another lot on which the development is being carried out.

In addition, subclauses (4)–(7) apply to the calculation of site area for the purposes of applying a floor space ratio to proposed development.

PART D PROPOSED VARIATION TO STANDARDS IN CLAUSE 4.4 of PLEP 2011

Clause 4.6(4)(a)(ii) requires that a request to vary a development standard must establish that the Proposal will be in the public interest because it is consistent with the objectives of the development standard and the zone. *Initial Action Pty Ltd v Woollahra Municipal Council* [2018] NSWLEC 118 at 27

Importantly, the word consistent has been interpreted as 'compatible' or 'capable of existing in harmony'. *Kingsland Developments Australia Pty Ltd City of Parramatta Council* [2018] NSWLEC 1241 at 20.

4.1 OBJECTIVES OF THE STANDARD

A key determinant of the appropriateness of a Clause 4.6 Variation to a development standard is the proposal's compliance with the underlying objectives and purpose of that development standard.

Clause 4.4 of PLEP 2011 sets out specific objectives. Those objectives under PLEP 2011 are responded to in **TABLE 3** below.

TABLE 3: CONSISTENCY WITH THE CLAUSE 4.4 OBJECTIVES

Objective	Response
(a) to regulate density of development and generation of vehicular and pedestrian traffic	The application of clause 4.4 is not limited to the IN1 zone. Clause 4.4 applies to all land that is shown coloured on the Floor Space Ratio Map. The land coloured on the floor space ratio map is subject to many different zonings. In these circumstances it is clear that objective (a) is explanatory of the central purpose of the floor space ratio development standard (*Baron Corporation Pty Limited v Council of the City of Sydney* [2019] NSWLEC 61 at [49]). In the IN1 zone in the locality of the Site, an FSR of 1:1 has been set as the maximum FSR that a development may have to enable appropriate density of development, and regulate generation of vehicular and pedestrian traffic The density of the Proposal is appropriate for the capacity of the locality in terms of infrastructure and services. The exceedance in floor space (in this case, due to the basement storage premises) does not give rise to any impacts on the locality. The additional floor space above the 1:1 prescribed under Clause 4.4 does not cause any traffic or parking issues on the surrounding road network as it creates negligible additional traffic or truck movements. The traffic analysis for the Proposal indicates that the Proposal can operate at a satisfactory level of service in both the AM and PM peak periods. The Proposal makes adequate provision for onsite car parking to support the floor space proposed. The additional FSR beyond the 1:1

TABLE 3: CONSISTENCY WITH THE CLAUSE 4.4 OBJECTIVES	
Objective	Response
	generates the provision of 1 additional car parking space that is allocated to the storage premises. This spaces is accommodated on Site, thus negating reliance on any on-street car parking to support the land uses. There are no issues with the sewage or stormwater drainage, nor the provision of facilities and services. In light of the above, the Proposal achieves objective (a) of the FSR development standard.
(b) to provide a transition in built form and land use intensity within the area covered by this Plan,	The density of the Proposal reflects the locality and provides an appropriate transition in land use intensity and scale within the area. The Proposal is compatible with the surrounding area and adjoining similar industrial developments. The Proposal has been configured with respect to the surrounding industrial and warehouse properties and the existing and desired character of the area through a sophisticated and modern warehouse development. The proposed building bulk and scale would not cause any undesirable visual impact, view obstruction, privacy intrusion or loss of solar access owing to the provision of adequate setbacks, building separation and deep-soil landscaping It is considered that the Proposal will result in an improvement to the existing Site and contribute positively to the Northmead industrial precinct. The Proposal will create visual interest and positive aesthetics which will contribute to the streetscape. Further to this, the Proposal delivers a high-quality urban design outcome through the façade articulation. Whilst it is acknowledged that the Proposal would result in maximum height above that permitted on the Site, this is typical of the urban industrial setting and seeks to provide a development that responds to the topography and context in which the Site is located. It is noted that a number of larger warehouse developments are located to the east of the Site along Briens Road, and large mixed-use developments to the south along Mons Road. ▪ At 104-128 Briens Road to the east of the Site, the Coca-Cola Site contains a number of large warehouse and silo buildings. The silo building approved under Determination No. DA/454/2020 has a height of 21.4 metres and was approved with a Clause 4.6 variation request. Another single storey

TABLE 3: CONSISTENCY WITH THE CLAUSE 4.4 OBJECTIVES

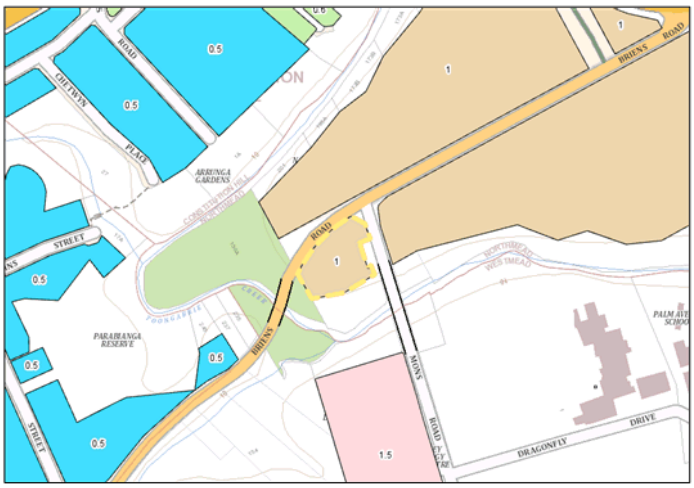
Objective	Response
	warehouse on the site has a height of 31 metres (to RL 46.8 as shown on survey). ▪ To the south of the Site fronting Mons Road, a number of large mixed-use developments range in height from 15 metres (4 storeys) to 21 metres (7 storeys at 32-34 Mons Road). Given the 9.5 metre height limit for the low density residential zoned land to the west and north-west of the Site, the proposed 14.59m high Proposal presents an appropriate transition in built form within the area. As illustrated in **Figure 1** below, the Proposal is located between higher density mixed use development to the south with an FSR of 1.5:1, sites with a similar density to the north and west of 1:1, and lower density development to west and further to the north ranging from 0.8:1 and 0.5:1. The Proposal, with an FSR of 1.02:1, provides an appropriate transition in land use intensity from the developments to the surrounding developments.  **Figure 1. Floor Space Ratio Map** (NSW Legislation, 2022)
(c) to require the bulk and scale of future buildings to have regard to heritage sites and their settings,	The Proposal is not located in close proximity to any heritage item or area of heritage conservation and therefore this objective is not relevant to the Proposal.

TABLE 3: CONSISTENCY WITH THE CLAUSE 4.4 OBJECTIVES	
Objective	Response
(d) to reinforce and respect the existing character and scale of low density residential areas	The Site is not located within a low density residential area nor will it be visible from any low density residential zoned land. Therefore, this objective is not relevant to the Proposal.

4.2 OBJECTIVES OF THE ZONE

The Site is zoned IN1 General Industrial pursuant to PLEP 2011. Therefore, consideration has been given to the zone objectives in **TABLE 4** below:

TABLE 4: CONSISTENCY WITH THE IN1 GENERAL INDUSTRIAL ZONE OBJECTIVES	
Objective	Response
To provide a wide range of industrial, warehouse land uses.	The Proposal involves the construction of flexible industrial tenancies that are capable of providing a range of light industrial, warehouse, storage and related land uses. The use of the Site is permitted with consent under the zoning.
To encourage employment opportunities	The Proposal will provide significant employment opportunities to the immediate community and wider locality within the Parramatta LGA during the construction and operational phases of the development, as well as contribute to viable economic return to the local and regional economies. The redevelopment of what is currently an underutilised site and construction of new industrial development will provide greater flexibility in the tenancy offerings at the Site and encourage a variety of land uses to support the locality, whilst providing an improved aesthetic on the Site. The exceedance is also consistent with this objective. The variation effectively provides for additional GFA to support a variety of tenancy sizes and configurations on the Site and, in doing so, encourages employment opportunities.
To minimise any adverse effect of industry on other land uses.	The Proposal and the exceedance does not result in any additional or unacceptable impact on other land uses. The Proposal is not readily visible from any residential-zoned land or other sensitive receiver and therefore does not result in any unreasonable bulk and scale impacts. In addition, the nature of operations associated with future tenancies would have no direct adverse impact on any surrounding land uses given: ▪ Sufficient parking is provided on Site.

TABLE 4: CONSISTENCY WITH THE IN1 GENERAL INDUSTRIAL ZONE OBJECTIVES	
Objective	Response
	▪ The road network would continue to operate a satisfactory level of service in the AM and PM peak periods. ▪ Noise and air impacts would comply with EPA requirements. ▪ The bulk and scale of the development would not overshadow or adversely affect amenity of surrounding industrial properties. ▪ The development provides onsite stormwater management outcomes which would not adversely affect other surrounding land uses. ▪ The extent of landscaping proposed provides a visual buffer to ameliorate the appearance of the building when viewed from other properties. ▪ All development will be wholly contained within the Site and will not interfere with the operation of surrounding land uses.
To facilitate a range of non-industrial land uses that serve the needs of workers and visitors.	It is understood that "other land uses" relates to other permissible uses in the zone that are not industrial in nature, such as take away food and drink premises. The Proposal is not inconsistent with this objective.

In light of the above, the Proposal, including the exceedance, is consistent with three of the zone objectives and neutral with respect to one.

4.3 ESTABLISHING IF THE DEVELOPMENT STANDARD IS UNREASONABLE OR UNNECESSARY

Subclause 4.6(3)(a) and the judgement in *Four2Five Pty Ltd v Ashfield Council* (refer to **Section 2.1**) emphasise the need for the proponent to demonstrate how the relevant development standard is unreasonable or unnecessary in the circumstances.

In view of the unique circumstances of the Site and absence of any discernible impact to the public domain, strict compliance with Clause 4.4 of PLEP 2011 is considered to be both unnecessary and unreasonable.

The case of *Wehbe v Pittwater Council* [2007] NSWLEC 827 sets out five ways in which numerical compliance with a development standard might be considered unreasonable or unnecessary as follows:

- Establish that compliance with the development standard is **unreasonable or unnecessary** because **the objectives of the standard are achieved notwithstanding the non-compliance with the standard**
- The underlying objective or purpose of the standard is not relevant to the development and therefore compliance is unnecessary
- The underlying objective or purpose would be defeated or thwarted if compliance was required and therefore compliance is unreasonable

- The development standard has been virtually abandoned or destroyed by the Council's own actions in granting consents departing from the standard and hence compliance with the standard is unnecessary and unreasonable; and/or
- The zoning of the particular land is unreasonable or inappropriate so that a development standard appropriate for that zoning is also unreasonable or unnecessary. That is, the particular parcel of land should not have been included in the particular zone.

Above is a detailed assessment against the objectives of the development standard and adopted the first test in *Wehbe* to establish that compliance is unreasonable or unnecessary because the objectives of the FSR standard are satisfied notwithstanding the variation.

- The Proposal is consistent with the existing and desired future character of the Site and locality and the surrounding area in that it provides for a scale of development that when viewed from the streetscape and surrounding properties is not dominant in terms of bulk, scale, extent of hardstand or interface with the streetscape. It is argued that the Proposal provides a development outcome that, in replacing the existing underutilised vacant Site, improves the character of the area.

- The Proposal results in a variation of 167sqm or 2.5% which is negligible in respect of the entire scheme.

- It is noted that the portion of the Proposal that provides additional GFA to exceed the FSR development standard, being the basement level, is not visible from any public place and does not add any additional bulk to the Proposal.

- A reduction in the scale of the development to reduce the Proposal to a compliant FSR would involve removing the basement level hence reducing the GFA. This change would not be readily visible from the public domain and would not result in an improved streetscape presentation. Therefore, complying with the standard would have no material benefit on the streetscape presentation.

- While compliance may be achieved by reducing the GFA of the Proposal, this is considered to undermine the functionality of the building; and the operational requirements the end-users will be unable to be facilitated. The Proposal seeks to provide a variety of tenancy spaces and configurations to suit the need of a spectrum of future industrial tenants. Furthermore, all required car parking for the industrial warehouse units can be accommodated on the ground and first floor levels, therefore the basement is not required for car parking.

- It is noted that the Proposal and the exceedance does not result in any additional or unacceptable impact on other land uses, and the Proposal is not readily visible from any residential-zoned land or other sensitive receiver. The Proposal does not result in any unreasonable impacts on adjoining development in respect of overshadowing, visual bulk, privacy or other amenity impacts due to the island nature of the Site.

In view of the circumstances of the Proposal, strict compliance with clause 4.4 of PLEP 2011 is considered to be both unnecessary and unreasonable. The Proposal does not conflict with the intent of Clause 4.4 of PLEP 2011 as demonstrated above and satisfies its objectives, notwithstanding the proposed numerical variation.

The proposed FSR variation will retain compatibility with surrounding development and continue to support a wide range of industrial and warehouse land uses in the locality, consistent with the objectives of the IN1 General Industrial zone.

The abovementioned justifications are considered valid, and in this instance the Clause 4.6 Variation is considered to be acceptable. The Proposal represents a more efficient use of the Site. The objectives of the relevant clause and IN1 General Industrial zone would be upheld as a result of the Proposal.

4.4 SUFFICIENT ENVIRONMENTAL PLANNING GROUNDS TO JUSTIFY CONTRAVENING THE DEVELOPMENT STANDARD

The Variation Request is considered well founded because, notwithstanding the proposed non-compliance with the maximum permitted FSR:

- The proposed FSR variation is consistent with the underlying objective or purpose of the standard as demonstrated in **Section 4.1**.
- The proposed FSR variation is consistent with the objectives of the IN1 General Industrial zone as described in **Section 4.2**.
- Compliance with the standard would be unreasonable and unnecessary for the reasons outlined in **Section 4.3**.
- The additional floor space above the 1:1 prescribed under Clause 4.4 does not cause any network or capacity issues on the surrounding road network. Traffic analysis for the Proposal indicates that the effect of additional density caused by the additional warehouse floor area does not cause any discernible impact on the locality by way of traffic.
- Further to the above, the Proposal makes adequate provision for onsite car parking to support the floor space proposed, thus negating reliance on external car parking to support the land uses. The Proposal in this respect contains all operations within the Site boundaries and allows sufficient area so as to not adversely affect any land external to the Site. In this regard, the effect of additional density caused by the additional warehouse floor area does not cause any discernible impact on the locality by way of parking pressure. The additional car parking spaces triggered by the additional floor space is negligible and is accommodated on Site.
- The Proposal provides compliant setbacks to boundaries and landscaping zones that provide separation and screening of the built form. The proposed landscaped building setback of 4.5 metres across the entire Briens Road frontage of the Site and ameliorates the visual impacts associated with the new built form.
- The Proposal ultimately seeks to facilitate construction and operation of a new industrial development. The proposed FSR is considered a key attribute in creating an internal building environment that would ensure the delivery of industrial warehouse facilities required to support the operations of the future tenants involved and thereby enabling the productive use of the Site.

- The proposed volumetric outcome is representative of market needs and demands for modernised industrial warehouse and industrial facilities to ensure that products can be stored internal to the building and minimises external exposure.

- The additional FSR would facilitate the proposal for warehousing, light industry and related purposes which specifically suit the needs of the future tenants and maximise the operational efficiencies of the premise.

- The Proposal provides suitable stormwater management outcomes in accordance with PLEP 2011 and PDCP 2011 ensuring that provision is made for all necessary stormwater infrastructure.

- The Proposal has been architecturally designed to provide a materiality and form that sets a desirable precedent for future development and ensures that the visual impact of the building integrates with the surrounding environment.

- There would be no impacts on any sensitive receptors due to the proposal in relation to solar access, privacy or visual bulk

- It is demonstrated that subject to the implementation of the design recommendations, the proposed building footprint would have no adverse or non-compliant acoustic outcomes on any nearby residential, industrial or commercial receivers during daytime, evening or night-time periods.

- The Proposal would remain compatible with Industrial land uses in light of the above.

- Compliance with the remaining development standards applicable to the site is achieved. There would be no measurable environmental or amenity benefits in maintaining the standard nor would this support the provision of warehouse and other light industrial uses which caters to the operational needs of the end users and the market needs of the industry.

For the reasons outlined above, it is considered that the variation to the FSR control under Clause 4.4 is appropriate and can be clearly justified having regard to the matters listed within clause 4.6(3)(b) under PLEP 2011.

4.5 PUBLIC INTEREST

Clause 4.6(4)(a)(ii) requires the proposal to be in the public interest because it is consistent with the objectives of the particular standard and the objectives for development within the zone in which the development is proposed to be carried out.

Section 4.3 and **Section 4.4** above demonstrate how the Proposal will be in the public interest because it is consistent with the objectives of the particular standard and the objectives for development within the zone in which the development is proposed to be carried out.

In Lane Cove Council v Orca Partners Management Pty Ltd (No 2) [2015] NSWLEC 52, Sheahan J referred to the question of public interest with respect to planning matters as a consideration of whether the public advantages of the proposed development outweigh the public disadvantages of the proposed

development.

The Proposal provides the following public benefits:

- Maintains the prevailing character of the area;
- Supports industrial uses within the IN1 General Industrial zone; and
- Facilitates modern and efficient industrial warehouse tenancy spaces.

There are no identifiable public disadvantages which will result from the Proposal in terms of amenity impacts on adjoining uses and streetscape or environmental impacts on the locality.

The Proposal is therefore considered to be in the public interest.

4.6 MATTERS OF STATE AND REGIONAL SIGNIFICANCE

The non-compliance with Clause 4.4 of PLEP 2011 does not give rise to any matters of significance for the State or regional environmental planning. The non-compliance does also not conflict with any State Environmental Planning Policies or Ministerial Directives under section 9.1 of the EP&A Act.

Planning Circular PS 20-002, dated 5 May 2020, prescribes that all consent authorities may assume concurrence of the Secretary of the Department of Planning and Environment where it is required under Clause 4.6 of a Local Environmental Plan, unless the development contravenes a numerical development standard by more than 10%. The Proposal does not contravene the FSR development standard by more than 10% and therefore the concurrence of the Secretary is assumed.

4.7 PUBLIC BENEFIT IN MAINTAINING THE STANDARD

Strict compliance with Clause 4.4 of PLEP 2011 will result in:

- Reduce employment opportunities as strict compliance with the 1:1 FSR limit will undermine the functionality of the development and hinder the efficient use of the floor space of the building which is an employment-generating development in the City of Parramatta LGA

- Not meet the operational requirements of modern industrial development. This is evident in the FSR controls prescribed by the environmental planning instruments in other LGAs where there is no FSR limit prescribed for industrial zoned land.

Further to the above, in the event the development standard was maintained, the resulting benefits to the adjoining properties and wider public would be nominal. It is noted that strict compliance with clause 4.4 would inhibit the development from operating at its full capacity, by not facilitating the operational requirements of the end users, which would ultimately impact on the future industrial and warehouse land uses on the Site. As such, it has been demonstrated that the additional FSR is reasonable and necessary for the proposed warehouse development, which will support industrial land uses in the City of Parramatta LGA.

Accordingly, there is no genuine or identifiable public benefit in maintaining this strict FSR control in the context of the Proposal.

4.8 OBJECTIVES OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

All planning determinations made under the EP&A Act are required to be made with regard to the objects of the Act in accordance with section 1.3 of the EP&A Act. **TABLE 5** below assesses the Proposal against the objects of the EP&A Act.

TABLE 5: EP&A ACT OBJECTIVES

Objective	Response
(a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources,	The Proposal is considered to be in the public interest as it would contribute towards meeting the demand for increased employment opportunities and promote the economic welfare of the Parramatta LGA, as identified in *A Metropolis of Three Cities*, and the *Western District Plan*. Additionally, the Proposal would be of social benefit as it would provide employment-generating opportunities for the immediate locality.
(b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment,	The Proposal promotes the principles of ecologically sustainable development (ESD) by achieving reductions in potable water import by capturing rainwater on Site and reusing this for non-potable uses, achieves pollution reduction targets, and employs OSD for the control of stormwater discharge from the Site Measures such as erosion and sediment control, and planting of native vegetation will further contribute to ESD.
(c) to promote the orderly and economic use and development of land,	The Proposal revitalises a Site that is underutilised and unable to accommodate employment densities envisaged under the IN1 zone. The provision of the built form proposed achieves a balanced outcome with respect to achieving the floor space density required for the Site to successfully operate whilst ensuring acceptable environmental impacts in terms of: ▪ visual amenity ▪ noise ▪ traffic generation ▪ stormwater management The Proposal therefore accords with this objective.
(d) to promote the delivery and maintenance of affordable housing,	The Proposal will not negatively impact the delivery and maintenance of affordable housing.

(e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats,	The Proposal would not create the risk of serious or irreversible damage to the environment. Ultimately, the Proposal would not create any threats of serious or irreversible environmental damage which would require further scientific study to fully ascertain. The Proposal would not impact on the conservation of biological diversity or the ecological integrity of the locality.
(f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),	The Proposal is not located nearby any item of heritage significance.
(g) to promote good design and amenity of the built environment,	The Proposal promotes good design and amenity of the built environment by providing an outcome that achieves a balanced landscaped setting on the site that integrates with the contemporary yet highly functional building to accommodate a range of uses. The Proposal sets a desirable precedent through materiality, modulation, suitable setbacks, landscaping and provision of suitable onsite car parking.
(h) to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants,	The Proposal can be constructed and maintained without health and safety risks to future tenants.
(i) to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State,	The Proposal is considered to be local development, for which the Consent Authority will be City of Parramatta Council.
(j) to provide increased opportunity for community participation in environmental planning and assessment.	The DA is subject to the relevant public notification requirements.

4.9 SUMMARY

For the reasons outlined above, it is considered that the variation to Clause 4.4 of PLEP 2011 is well-founded and appropriate in the circumstances. Furthermore, the Variation Request is considered to be well-founded for the following reasons as outlined in Clause 4.6 of PLEP 2011 and relevant case law:

- Compliance with the development standard is unreasonable and unnecessary in the circumstances (refer to **Section 4.3** as part of the First Limb satisfied);
- There are sufficient environmental planning grounds to justify contravening the development standard (refer to **Section 4** as part of the First Limb satisfied);
- The Proposal is in the public interest because it is consistent with the objectives of the particular standard and the objectives for development within the zone in *which the development is proposed to be carried out* (refer to **Section 4.5** as part of the Second Limb satisfied);
- The Proposal is consistent with the objectives of the particular standard and the objectives of the standard are achieved notwithstanding the non-compliance with the standard.(refer to **Section 4.1** as part of the Second Limb satisfied);
- The Proposal is consistent with the objectives for development within the zone and long term strategic intentions to provide employment generating land use (refer to **Section 4.2** as part of the Second Limb satisfied);
- The Proposal does not give rise to any matter of significance for the State or regional environmental planning and is consistent with the visions and objectives of the relevant strategic plans (refer to **Section 4.6** as part of the Third Limb satisfied);
- The public benefit in maintaining strict compliance with the development standard would be negligible (refer to **Section 4.7** as part of the Third Limb satisfied); and
- The Proposal is consistent with the objectives of the *Environmental Planning and Assessment Act 1979* (refer to **Section 8).**

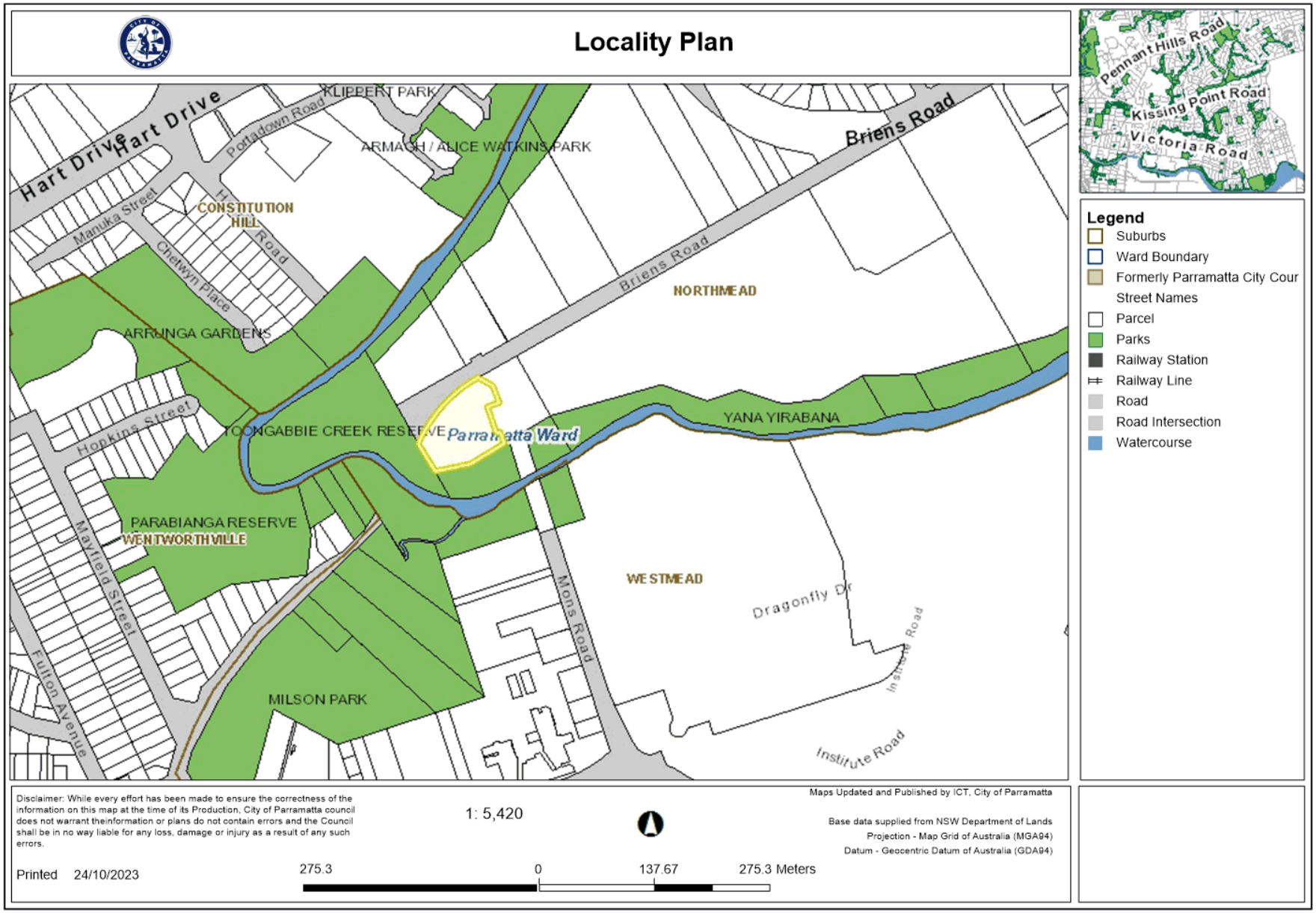
Overall, it is considered that the variation to the FSR development standard is appropriate and is justified having regard to the matters listed within Clause 4.6 of PLEP 2011.

PART E CONCLUSION

For the reasons outlined above, it is requested that Council support the Variation Request, which seeks approval for non-compliance with Clause 4.4 of PLEP 2011 for the following reasons:

- Compliance with the development standard is unreasonable and unnecessary in the circumstances of the case;
- There are sufficient environmental planning grounds to justify contravening the development standards;
- The Proposal will capitalise on the Site's full planning potential;
- The Proposal satisfies the objectives of the IN1 General Industrial zone and Clause 4.4 of PLEP 2011; and
- There is no public benefit in maintaining strict compliance with the standards.

Council should be satisfied that the Variation Request has addressed and meets the requirements of Clause 4.6 of PLEP 2011 and should be favourably considered by Council.


Locality Plan
Hart Drive
Portadown Road
KLIPPERT PARK
ARMAGH / ALICE WATKINS PARK
Briens Road
Manuka Street
CONSTITUTION HILL
Chelwyn Place
NORTHMEAD
ARRUNGA GARDENS
Hopkins Street
TOONGABBIE CREEK RESERVE
Parramatta Ward
YANA YIRABANA
PARABIANGA RESERVE
WENTWORTHVILLE
Mayfield Street
Fulton Avenue
Mons Road
WESTMEAD
Dragonfly Dr
Institute Road
MILSON PARK
Pennant Hills Road
Kissing Point Road
Victoria Road
Legend
Suburbs
Ward Boundary
Formerly Parramatta City Cour
Street Names
Parcel
Parks
Railway Station
Railway Line
Road
Road Intersection
Watercourse
Disclaimer: While every effort has been made to ensure the correctness of the information on this map at the time of its Production, City of Parramatta council does not warrant theinformation or plans do not contain errors and the Council shall be in no way liable for any loss, damage or injury as a result of any such errors.
1: 5,420
Maps Updated and Published by ICT, City of Parramatta
Base data supplied from NSW Department of Lands
Projection - Map Grid of Australia (MGA94)
Datum - Geocentric Datum of Australia (GDA94)
Printed 24/10/2023
275.3
0
137.67
275.3 Meters

DEVELOPMENT SUMMARY	
TOTAL SITE AREA	6,490 m²
FSR	1 : 1.02
TOTAL GROSS FLOOR AREA	6,657 m²
TOTAL LANDSCAPE SITE COVERAGE	12% (783m²)

TOTAL WAREHOUSE GFA	LEVEL GF	1895 m²
TOTAL WAREHOUSE GFA	LEVEL 01	2302 m²
TOTAL STORAGE GFA	BASEMENT	476 m²
TOTAL OFFICE GFA	GROUND FLOOR MEZ	940 m²
TOTAL OFFICE GFA	LEVEL 1 MEZZ	1005 m²
LOBBY	LEVEL GF	19 m²
LOBBY	LEVEL 01	20 m²
TOTAL BUILDING GFA		6657 m²

CAR PARKING	
BASEMENT CAR PARKING	6
GROUND FLOOR CAR PARKING	26
LEVEL 01 CAR PARKING	27
TOTAL CAR PARKING PROVIDED (INC. SELF STORAGE)	59

NOTES:

1. GROSS LETTABLE AREA (GLA) AS DEFINED BY PROPERTY COUNCIL AUSTRALIA - METHOD OF MEASUREMENT 2008
2. GROSS FLOOR AREA (GFA) AS DEFINED BY PARRAMATTA LOCAL ENVIRONMENTAL PLAN 2008
3. MAX FSR 1:1 AS DENOTED BY PARRAMATTA LEP 2011
4. CAR PARKING PROVISION BASED ON TRAFFIC ENGINEERS REPORT

Client
hannas

Project Name
150-152 Briens Road, Northmead

Project Address
150-152 Briens RD Northmead

Drawing Title:
SITE PLAN

Date: 03/08/2023
Sheet Size: A1
Scale: 1:500
Drawing Number: 12679_DA101
Issue: D

nettletontribe

DEMOLITION PLAN LEGEND

- PROPERTY BOUNDARY
- ELEMENTS TO BE DEMOLISHED

REFERENCED SURVEY WORKS

TITLE:	4289OT01
DRAWING REVISION:	G1
PREPARED BY:	STRATASURV
DATE:	19/03, 01 & 22/04/2020

NOTE

1. REFER TO LANDSCAPE ARCHITECTS DEMOLITION PLAN AND ARBORIST'S REPORT FOR VEGETATION TO BE DEMOLISHED
2. ALL EXISTING STRUCTURES AND INGROUND SERVICES LOCATED ON SITE TO BE DEMOLISHED UNLESS OTHERWISE NOTED
3. DEMOLITION OR AMENDMENT TO SERVICES AND FEATURES SET WITHIN COUNCIL LAND ARE SUBJECT TO COUNCIL APPROVAL

Client: hannas

Project Name: 150-152 Briens Road, Northmead

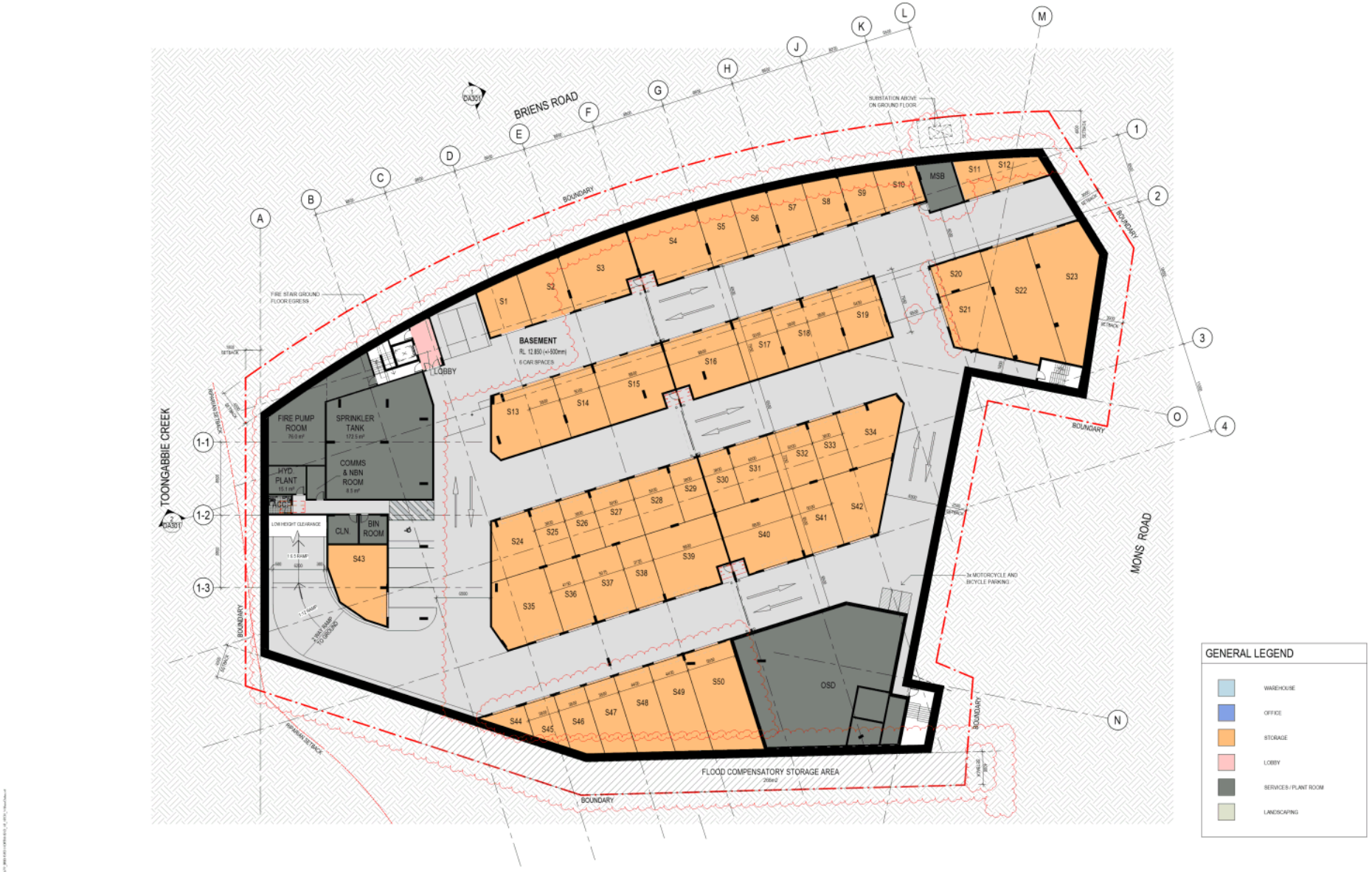
Project Address: 150-152 Briens RD Northmead

Drawing Title: DEMOLITION PLAN

Date: 12/04/2023 | Sheet Size: A1 | Scale: 1:500

Drawing Number: 12679_DA102 | Issue: B

nettletontribe



Client: hannas

Project Name: 150-152 Briens Road, Northmead

Project Address: 150-152 Briens RD Northmead

Drawing Title: BASEMENT FLOOR PLAN

Date: 04/08/2023 Sheet Size: A1 Scale: 1:200

Drawing Number: 12679_DA111 Issue: G

nettletontribe

Client: hannas

Project Name: 150-152 Briens Road, Northmead

Project Address: 150-152 Briens RD Northmead

Drawing Title: GROUND FLOOR PLAN

Date: 04/08/2023 Sheet Size: A1 Scale: 1:200

Drawing Number: 12679_DA112 Issue: K

nettletontribe

BRIENS ROAD
MONS ROAD
TOONGABBIE CREEK
BOUNDARY
GROUND FLOOR MEZZANINE
RL 19.450
O 01
O 02
O 03
O 04
O 05
O 06
O 07
O 08
O 09
O 10
O 11
O 12
O 13
O 14
O 15
O 16
O 17
1 WAY RAMP FROM GROUND FLOOR
1 WAY RAMP FROM LEVEL 1
GENERAL LEGEND
WAREHOUSE
OFFICE
STORAGE
LOBBY
SERVICES / PLANT ROOM
LANDSCAPING
Client
hannas
Project Name
150-152 Briens Road, Northmead
Project Address
150-152 Briens RD Northmead
Drawing Title:
GROUND FLOOR MEZZ PLAN
Date:
28/07/2023
Sheet Size:
A1
Scale:
1:200
Drawing Number:
12679_DA113
Issue:
D
nettletontribe

BRIENS ROAD
TOONGABBIE CREEK
MONS ROAD
BOUNDARY
RECREATION AREA SHOWN AS INDICATIVE TO LANDSCAPE DRAWINGS
LOBBY
WAREHOUSE 18
WAREHOUSE 19
WAREHOUSE 20
WAREHOUSE 21
WAREHOUSE 22
WAREHOUSE 23
WAREHOUSE 24
WAREHOUSE 25
WAREHOUSE 26
WAREHOUSE 27
WAREHOUSE 28
WAREHOUSE 29
WAREHOUSE 30
WAREHOUSE 31
WAREHOUSE 32
WAREHOUSE 33
WAREHOUSE 34
OFFICE ABOVE ON MEZ
LEVEL 1
RL 22.350
27 CAR SPACES
4x MOTORCYCLE AND BICYCLE PARKING
1 WAY RAMP TO GROUND
1 WAY RAMP FROM GROUND
RIPARIAN SETBACK
GENERAL LEGEND
WAREHOUSE
OFFICE
STORAGE
LOBBY
SERVICES / PLANT ROOM
LANDSCAPING
Client
hannas
Project Name
150-152 Briens Road, Northmead
Project Address
150-152 Briens RD Northmead
Drawing Title:
LEVEL 1 FLOOR PLAN
Date:
28/07/2023
Sheet Size:
A1
Scale:
1:200
Drawing Number:
12679_DA114
Issue:
D
nettletontribe

BRIENS ROAD
TOONGABBIE CREEK
MONS ROAD
BOUNDARY
LEVEL 1
MEZZANINE
RL 24.950
O 18
O 19
O 20
O 21
O 22
O 23
O 24
O 25
O 26
O 27
O 28
O 29
O 30
O 31
O 32
O 33
O 34
EAVES GUTTER
AWNING ABOVE DASHED
ROOF ABOVE DASHED
1 WAY RAMP FROM LEVEL 1
1 WAY RAMP TO LEVEL 1
GENERAL LEGEND
WAREHOUSE
OFFICE
STORAGE
LOBBY
SERVICES / PLANT ROOM
LANDSCAPING
Client
hannas
Project Name
150-152 Briens Road, Northmead
Project Address
150-152 Briens RD Northmead
Drawing Title:
LEVEL 1 MEZZ PLAN
Date:
28/07/2023
Sheet Size:
A1
Scale:
1:200
Drawing Number:
12679_DA115
Issue:
D
nettletontribe

Client: hannas

Project Name: 150-152 Briens Road, Northmead

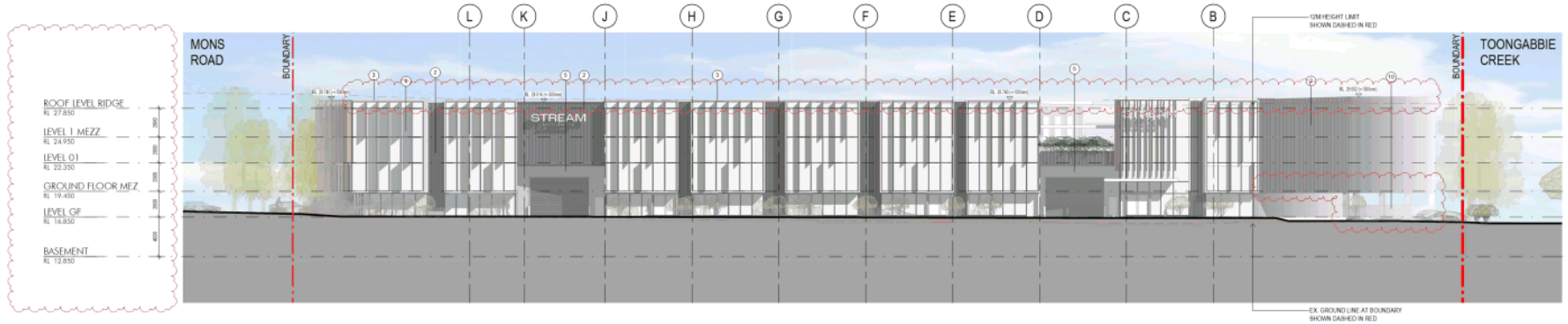
Project Address: 150-152 Briens RD Northmead

Drawing Title: ROOF PLAN

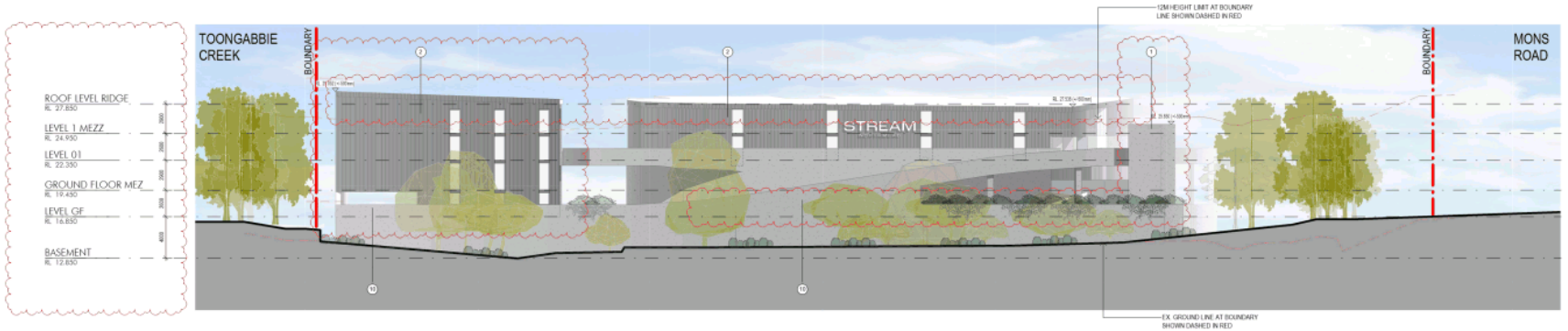
Date: 21/07/2023 | Sheet Size: A1 | Scale: 1:200

Drawing Number: 12679_DA116 | Issue: C

nettletontribe



1 NORTH ELEVATION 1:200



2 SOUTH ELEVATION 1:200

EXTERNAL FINISHES

1. PRECAST CONCRETE
2. LONGLINE METAL SHEETING - COLORBOND MONUMENT
3. CONCRETE LOOK CFC - CEMINTEL QUARRY
4. VERTICAL LOUVERS - TIMBER LOOK
5. PERFORATED MESH SCREEN - GALVANISED
6. DOWNPIPES, REVEALS, FLASHING & CAPPINGS - COLORBOND MONUMENT
7. CFC / COLOURBACK GLASS
8. CLEAR GLASS
9. GLASS BRICK
10. INSITU CONCRETE
11. LONGLINE METAL SHEETING - COLORBOND WINDSPRAY

Client: hannas

Project Name: 150-152 Briens Road, Northmead

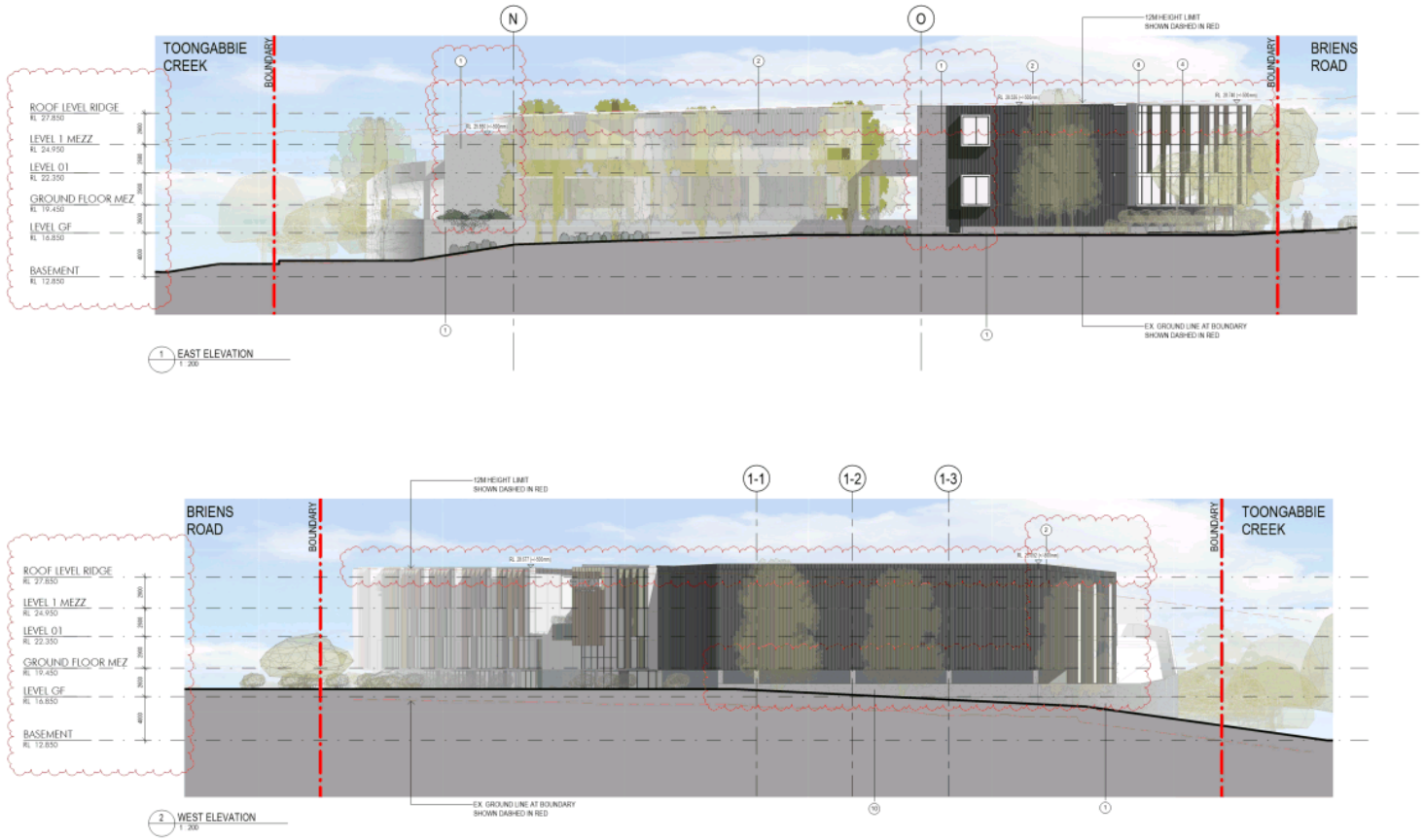
Project Address: 150-152 Briens RD Northmead

Drawing Title: BUILDING ELEVATIONS SHEET 1

Date: 28/07/2023 | Sheet Size: A1 | Scale: 1:200

Drawing Number: 12679_DA201 | Issue: D

nettletontribe



Client: hannas

Project Name: 150-152 Briens Road, Northmead

Project Address: 150-152 Briens RD Northmead

Drawing Title: BUILDING ELEVATIONS SHEET 2

Date: 28/07/2023 Sheet Size: A1 Scale: 1:200

Drawing Number: 12679_DA202 Issue: D

nettletontribe

Client: hannas

Project Name: 150-152 Briens Road, Northmead

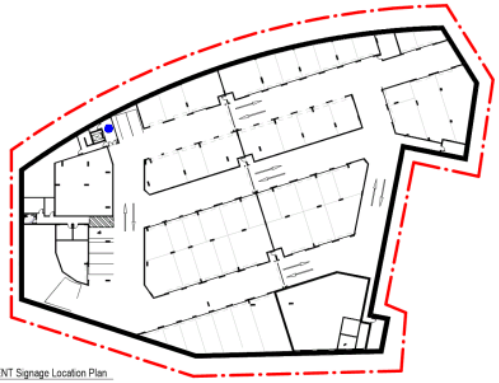
Project Address: 150-152 Briens RD Northmead

Drawing Title: BUILDING SECTIONS

Date: 21/07/2023 Sheet Size: A1 Scale: 1:200

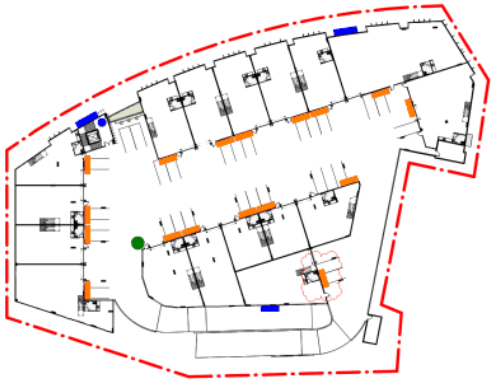
Drawing Number: 12679_DA301 Issue: C

nettletontribe



1 BASEMENT Signage Location Plan
1 : 500

2 GROUND FLOOR Signage Location Plan
1 : 500



3 LEVEL 1 Signage Location Plan
1 : 500

SIGNAGE LEGEND

- ESTATE ENTRY SIGN
- TENANT DIRECTIONAL SIGN
- TENANT SIGN
- ESTATE ENTRY & EXIT SIGN
- TENANT IDENTIFICATION SIGN
- BUILDING WALL SIGN
- BUILDING WALL TENANT SIGN

NOTES:

1. STATUTORY SIGNAGE AS REQUIRED TO COMPLY WITH NCC 2019 AND ALL RELEVANT AUSTRALIAN STANDARDS .
2. TRAFFIC SIGNAGE AND LINEMARKING TO TRAFFIC CONSULTANT DETAILS
3. REFER TO STREAM NORTHMEAD BRAND GUIDELINE TO DESIGN INTENT.
4. ALL STORAGE UNITS ON BASEMENT TO HAVE INDIVIDUAL SIGNAGE

Client: hannas

Project Name: 150-152 Briens Road, Northmead

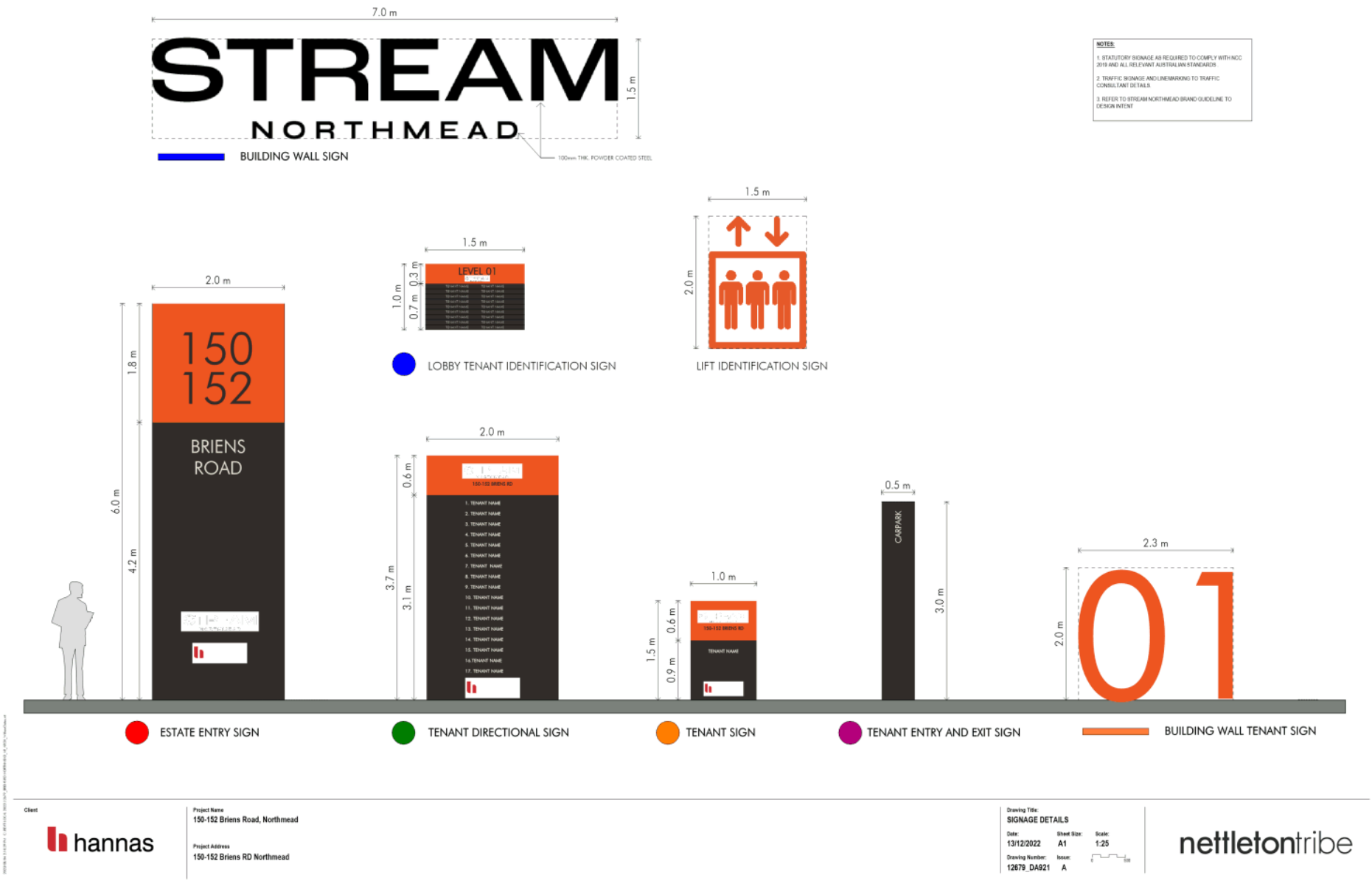
Project Address: 150-152 Briens RD Northmead

Drawing Title: SIGNAGE PLAN

Date: 21/07/2023 | Sheet Size: A1 | Scale: 1:500

Drawing Number: 12679_DA911 | Issue: C

nettletontribe


7.0 m
STREAM
NORTHMEAD
1.5 m
100mm THK. POWDER COATED STEEL
BUILDING WALL SIGN
NOTES:
1. STATUTORY SIGNAGE AS REQUIRED TO COMPLY WITH NCC 2019 AND ALL RELEVANT AUSTRALIAN STANDARDS
2. TRAFFIC SIGNAGE AND LINEMARKING TO TRAFFIC CONSULTANT DETAILS
3. REFER TO STREAM NORTHMEAD BRAND GUIDELINE TO DESIGN INTENT
1.5 m
LEVEL 01
1.0 m
0.3 m
0.7 m
LOBBY TENANT IDENTIFICATION SIGN
1.5 m
2.0 m
LIFT IDENTIFICATION SIGN
2.0 m
150
152
BRIENS
ROAD
1.8 m
4.2 m
6.0 m
ESTATE ENTRY SIGN
2.0 m
0.6 m
3.7 m
3.1 m
TENANT DIRECTIONAL SIGN
1.0 m
0.6 m
1.5 m
0.9 m
TENANT SIGN
0.5 m
CARPARK
3.0 m
TENANT ENTRY AND EXIT SIGN
2.3 m
01
2.0 m
BUILDING WALL TENANT SIGN
Client
hannas
Project Name
150-152 Briens Road, Northmead
Project Address
150-152 Briens RD Northmead
Drawing Title:
SIGNAGE DETAILS
Date:
13/12/2022
Sheet Size:
A1
Scale:
1:25
Drawing Number:
12679_DA921
Issue:
A
nettletontribe

Briens Road Northmead

150-152 Briens Road, Northmead

Landscape Development Application

Drawing Schedule

Drawing Number	Drawing Title	Scale
000	Landscape Coversheet	N/A
101	Landscape Plan - Ground	1:200
102	Landscape Plan - Level 1	1:200
501	Landscape Details	As Shown
502	Landscape Details	As Shown
701	Tree Canopy Plans	As Shown
702	Existing Tree Plan	1:200

Site Plan | 1:400

NOT FOR CONSTRUCTION

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The contractor shall check and verify all work on site (including work by others) before commencing the landscape installation. Any discrepancies are to be reported to the Project Manager or Landscape Architect prior to commencing work. Do not scale this drawing. Any required dimensions not shown shall be referred to the Landscape Architect for confirmation.

Legend

Issue	Revision Description	Drawn	Check	Date
H	Architectural Coordination	JW	NM	04.08.2023
G	Revised For Comments	CS	NM	28.07.2023
F	Revised For Comments	CS	NM	24.04.2023
E	Revised For Comments	JW	NM	12.04.2023
D	Revised For Comments	JW	NM	05.04.2023
C	Tree Retention Plan Added	CS	NM	20.12.2022
B	Architectural Coordination	JW	NM	15.12.2022
A	For Comment	JW	NM	24.11.2022

A1

SITE IMAGE

Landscape Architects

Client: Hannas

Project: Briens Road Northmead
150-152 Briens Road, Northmead

Drawing Name: Coversheet

PRELIMINARY

Scale

Job Number: SS22-5068

Drawing Number: 000

Issue: H

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Issue	Revision Description	Drawn	Check	Date
G	Architectural Coordination	JW	NM	04.08.2023
F	Revised For Comments	CS	NM	28.07.2023
E	Revised For Comments	CS	NM	24.04.2023
D	Revised For Comments	JW	NM	12.04.2023
C	Revised For Comments	JW	NM	05.04.2023
B	Architectural Coordination	JW	NM	15.12.2022
A	For Comment	JW	NM	24.11.2022

Legend

- Site Boundary
- Existing Tree to be Retained — Refer Arborist Report
- Existing Tree to be Removed — Refer Arborist Report
- Proposed Tree Planting — Refer Plant Schedule
- Proposed Accents and Shrubs — Refer Plant Schedule
- Proposed Grasses and Groundcovers — Refer Plant Schedule
- Proposed Riparian and Setback Matrix — Refer Plant Schedule
- Proposed Turf
- Proposed Concrete Paving
- Recreation Area Paving
- Gravel Pathway
- Bench Seating

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Client: Hannas

Project: Briens Road Northmead
150-152 Briens Road, Northmead

Drawing Name: Landscape Plan
Ground Floor

PRELIMINARY

Scale: 1:200 @ A1 (0, 5, 10m)
Job Number: SS22-5068
Drawing Number: 101
Issue: G

A1

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Issue	Revision Description	Drawn	Check	Date
D	Revised For Comments	CS	NM	28.08.2023
C	Revised For Comments	JW	NM	05.04.2023
B	Architectural Coordination	JW	NM	15.12.2022
A	For Comment	JW	NM	24.11.2022

A1

Legend

- Site Boundary
- Existing Tree to be Retained — Refer Arborist Report
- Existing Tree to be Removed — Refer Arborist Report
- Proposed Tree Planting — Refer Plant Schedule
- Proposed Accents and Shrubs — Refer Plant Schedule
- Proposed Grasses and Groundcovers — Refer Plant Schedule
- Proposed Riparian and Setback Matrix — Refer Plant Schedule
- Proposed Turf
- Proposed Concrete Paving
- Recreation Area Paving
- Gravel Pathway
- Bench Seating

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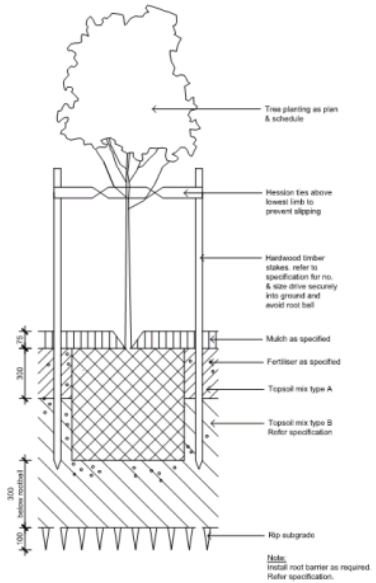
Client: Hannas

Project: Briens Road Northmead
150-152 Briens Road, Northmead

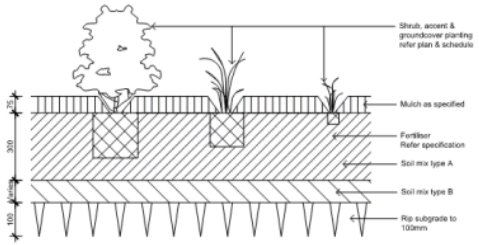
Drawing Name: Landscape Plan
Level 1

PRELIMINARY

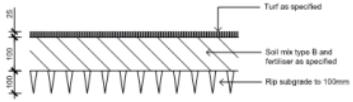
Scale: 1:200 @ A1 (0 3 6 10m)
Job Number: SS22-5068
Drawing Number: 102
Issue: D



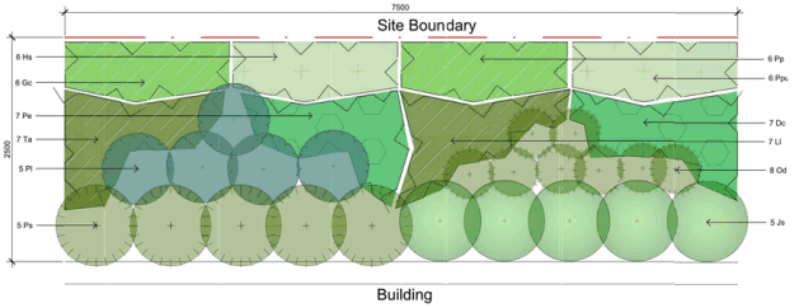
Detail 75-200L Tree Planting on Grade
1:10



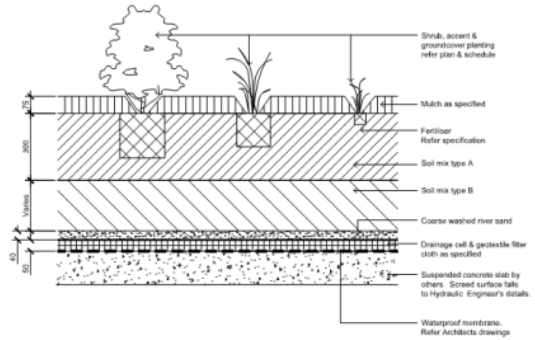
Detail Shrub Accent & Groundcover Planting on Grade
1:10



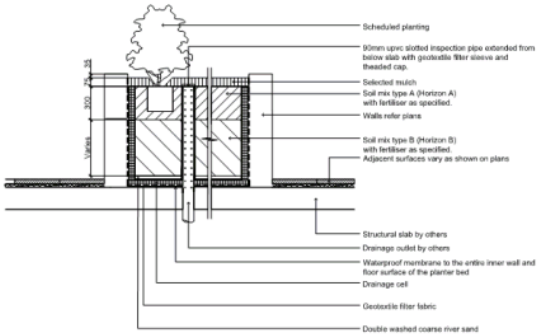
Detail Turf on Even Grade
1:10



Typical Riparian Planting Matrix
1:25



Detail Shrub Accent & Groundcover Planting on Structure
1:10



Section - Typical Raised Planter Bed on Structure
1:20
Inspection riser pipe

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Legend

Issue	Revision Description	Drawn	Check	Date
D	Revised For Comments	CS	NM	28.08.2023
C	Revised For Comments	JW	NM	12.04.2023
B	Revised For Comments	JW	NM	05.04.2023
A	For Comment	JW	NM	24.11.2022

A1

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Client
Hannas

Project
Briens Road Northmead
150-152 Briens Road, Northmead

Drawing Name
Landscape Details

PRELIMINARY

Scale

Job Number
SS22-5068

Drawing Number
501

Issue
D

PLANT SCHEDULE

	Botanic Name	Common Name	Mature Size	Pot Size	Density	PCT 1845	Qty
GROUND FLOOR							
TREES							
As	*Angophora subvelutina*	Broad-Leaved Apple	20 x 8	100L	As Shown	"	12
SHRUBS & ACCENTS							
Ca	*Correa alba*	White Correa	1.5 x 1.5	300mm	As Shown		190
De	*Doryanthes excelsa*	Gymea Lily	2 x 2	300mm	As Shown		33
Vo	*Viburnum odoratissum*	Sweet Viburnum	3 x 2.5	300mm	As Shown		51
Wf	*Westringia fruticosa*	Coastal Rosemary	2 x 2	300mm	As Shown		118
GRASSES & GROUND COVERS							
Dc	*Dianella caerulea*	Blue Flax Lily	0.75 x 0.75	150mm	5/m2	"	121
DSF	*Dichondra argentea 'Silver Falls'*	Silver Falls	0.1 x Spreading	150mm	5/m2		89
Hs	*Hibbertia scandens*	Snake Vine	0.2 x 2	150mm	5/m2	"	136
Ll	*Lomandra longifolia*	Mat Rush	0.75 x 1	150mm	5/m2	"	96
Ta	*Themeda australis*	Kangaroo Grass	1 x 0.3	150mm	5/m2	"	92
Tj	*Trachelospermum jasminoides*	Star Jasmine	0.3 x 1.5	150mm	5/m2		142
RIPARIAN MATRIX							
SHRUBS							
Js	*Jacksonia scoparia*	Dogwood	4 x 3	300mm	As Shown	"	147
Od	*Ozothamnus diosmifolius*	Rice Flower	1.5 x 1	300mm	As Shown	"	236
Pl	*Persoonia linearis*	Narrow-leaf Geebung	2 x 2	300mm	As Shown	"	147
Ps	*Polyscias sambucifolia*	Elderberry Panax	5 x 4	300mm	As Shown	"	147
GRASSES AND GROUNDCOVERS							
Dc	*Dianella caerulea*	Blue Flax Lily	0.75 x 0.75	150mm	5/m2	"	207
Gc	*Glycine clandestina*	Twining Glycine	0.3 x 2	150mm	5/m2	"	189
Hs	*Hibbertia scandens*	Snake Vine	0.2 x 2	150mm	5/m2	"	189
Ll	*Lomandra longifolia*	Mat Rush	0.75 x 1	150mm	5/m2	"	207
Pp	*Pandorea pandorana*	Wonga Wonga Vine	0.2 x Climbing	150mm	5/m2	"	189
Ppu	*Pratis purpurascens*	White Root	0.2 x 0.75	150mm	5/m2	"	189
Pe	*Pteridium esculentum*	Bracken	1.5 x 1.5	150mm	5/m2	"	207
Ta	*Themeda australis*	Kangaroo Grass	1 x 0.3	150mm	5/m2	"	207
LEVEL 01							
SHRUBS & ACCENTS							
Ca	*Correa alba*	White Correa	1.5 x 1.5	300mm	As Shown		7
Wf	*Westringia fruticosa*	Coastal Rosemary	2 x 2	300mm	As Shown		7
GRASSES & GROUND COVERS							
Dc	*Dianella caerulea*	Blue Flax Lily	0.75 x 0.75	150mm	5/m2	"	12
DSF	*Dichondra argentea 'Silver Falls'*	Silver Falls	0.1 x Spreading	150mm	5/m2		23
Tj	*Trachelospermum jasminoides*	Star Jasmine	0.3 x 1.5	150mm	5/m2		18

Angophora subvelutina
Broad-Leaved Apple

Correa alba
White Correa

Doryanthes excelsa
Gymea Lily

Viburnum odoratissum
Sweet Viburnum

Westringia fruticosa
Coastal Rosemary

Dianella caerulea
Blue Flax Lily

Dichondra argentea 'Silver Falls'
Silver Falls

Hibbertia scandens
Snake Vine

Lomandra longifolia
Mat Rush

Themeda australis
Kangaroo Grass

Trachelospermum jasminoides
Star Jasmine

Jacksonia scoparia
Dogwood

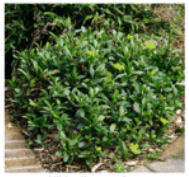
Ozothamnus diosmifolius
Rice Flower

Persoonia linearis
Narrow-leaf Geebung

Polyscias sambucifolia
Elderberry Panax

Dianella caerulea
Blue Flax Lily

Glycine clandestina
Twining Glycine



Hibbertia scandens
Snake Vine

Lomandra longifolia
Mat Rush

Pandorea pandorana
Wonga Wonga Vine

Pratis purpurascens
White Root

Pteridium esculentum
Bracken

Themeda australis
Kangaroo Grass

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Legend

Issue	Revision Description	Drawn	Check	Date
D	Architectural Coordination	JW	NM	04.08.2023
C	Revised For Comments	CS	NM	28.07.2023
B	Revised For Comments	JW	NM	05.04.2023
A	Architectural Coordination	JW	NM	15.12.2022

A1

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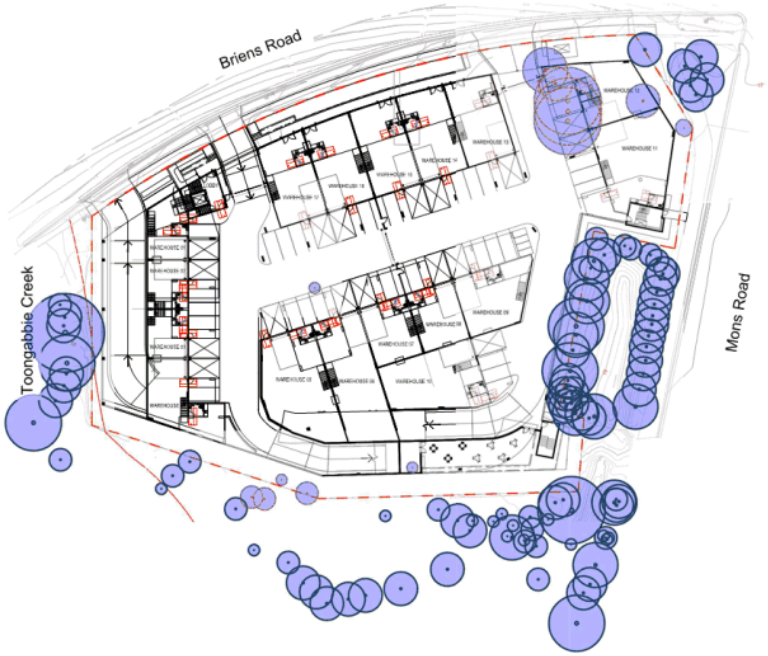
Client
Hannas

Project
Briens Road Northmead
150-152 Briens Road, Northmead

Drawing Name
Landscape Plant Schedule

PRELIMINARY

Scale
Job Number SS22-5068
Drawing Number 502
Issue D



01 Existing Tree Plan
1:400

Existing Canopy Area = 1,890.31 sqm
Canopy Area To Be Removed = 269.60 sqm

02 Proposed Tree Plan
1:400

Total Canopy Area (Proposed + Existing Retained) =1844.69 sqm

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Issue	Revision Description	Drawn	Check	Date
F	Architectural Coordination	JW	NM	04.08.2023
E	**Revised For Comments**	CS	NM	26.07.2023
D	**Revised For Comments**	CS	NM	24.04.2023
C	Revised For Comments	JW	NM	12.04.2023
B	Revised For Comments	JW	NM	05.04.2023
A	Tree Retention Plan Added	CS	NM	20.12.2022

Legend

- Site Boundary
- Existing Tree to be Retained (Refer Arborist Report)
- Existing Tree to be Removed (Refer Arborist Report)
- Proposed Tree Planting (Refer Plant Schedule)
- Proposed and Existing Retained Canopy Cover
- Existing Canopy Cover

A1

SITE IMAGE
Landscape Architects

Client: Hannas

Project: Briens Road Northmead
150-152 Briens Road, Northmead

Drawing Name: Tree Canopy Plans

PRELIMINARY

Scale: 1:400 @ A1
Job Number: SS22-5068
Drawing Number: 701
Issue: F

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Issue	Revision Description	Drawn	Check	Date
E	Architectural Coordination	JW	NM	04.08.2023
D	**Revised For Comments**	CS	NM	25.07.2023
C	Revised For Comments	CS	NM	24.04.2023
B	Revised For Comments	JW	NM	12.04.2023
A	Revised For Comments	JW	NM	05.04.2023

Legend

- Site Boundary
- Existing Tree to be Retained (T00) — Refer Arborist Report
- Existing Tree to be Removed (T00) — Refer Arborist Report

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Client: Hannas

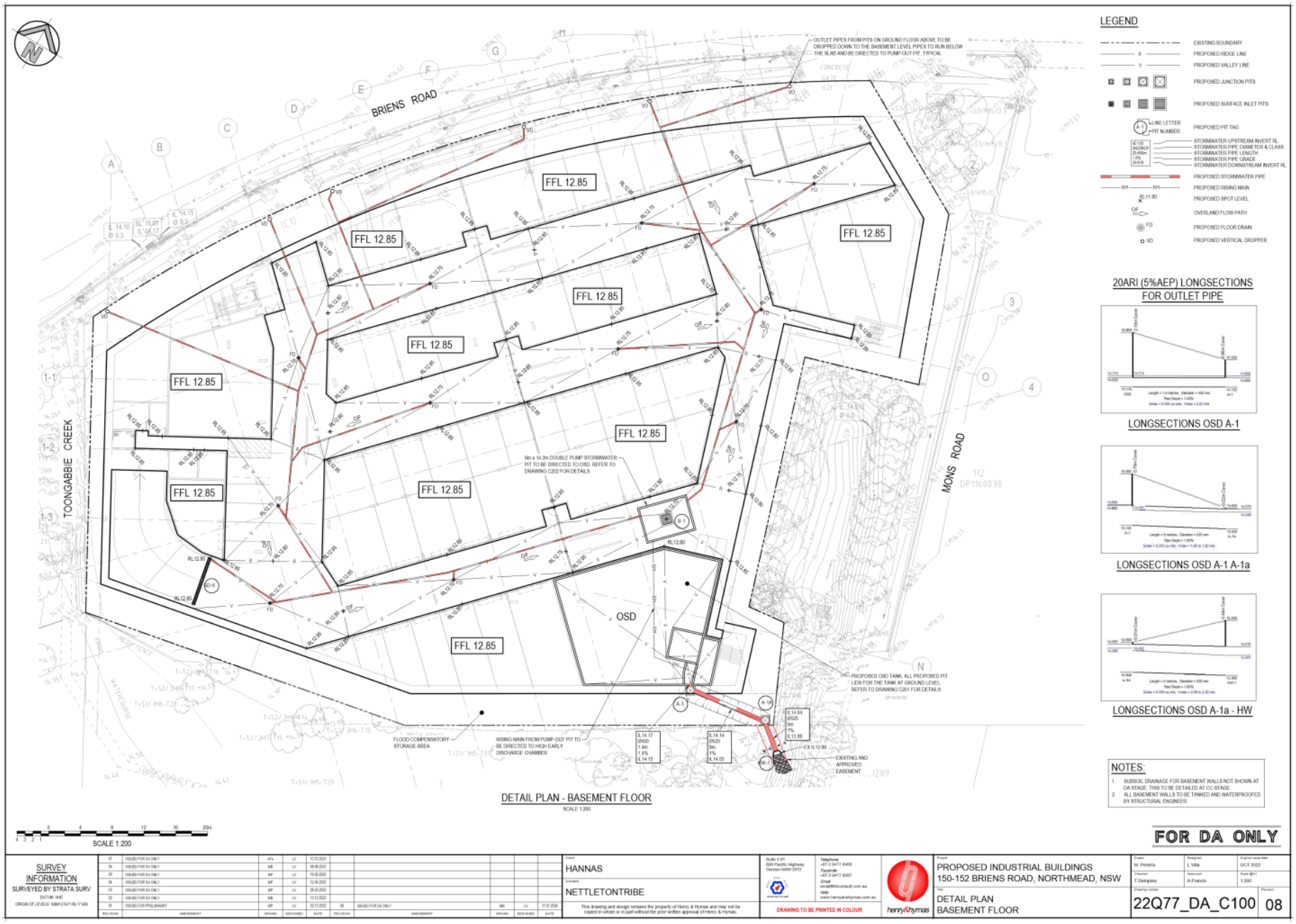
Project: Briens Road Northmead
150-152 Briens Road, Northmead

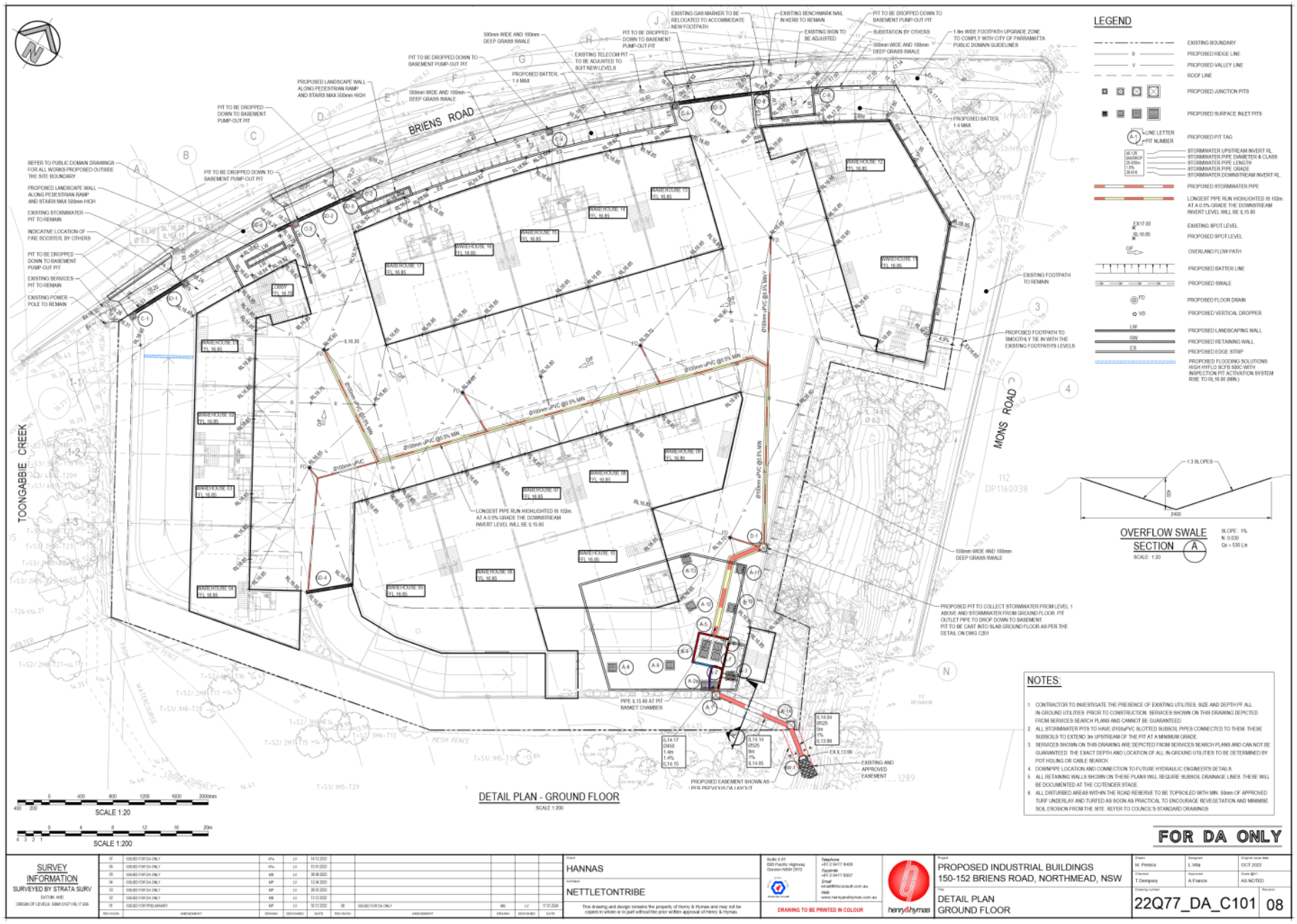
Drawing Name: Existing Tree Plan

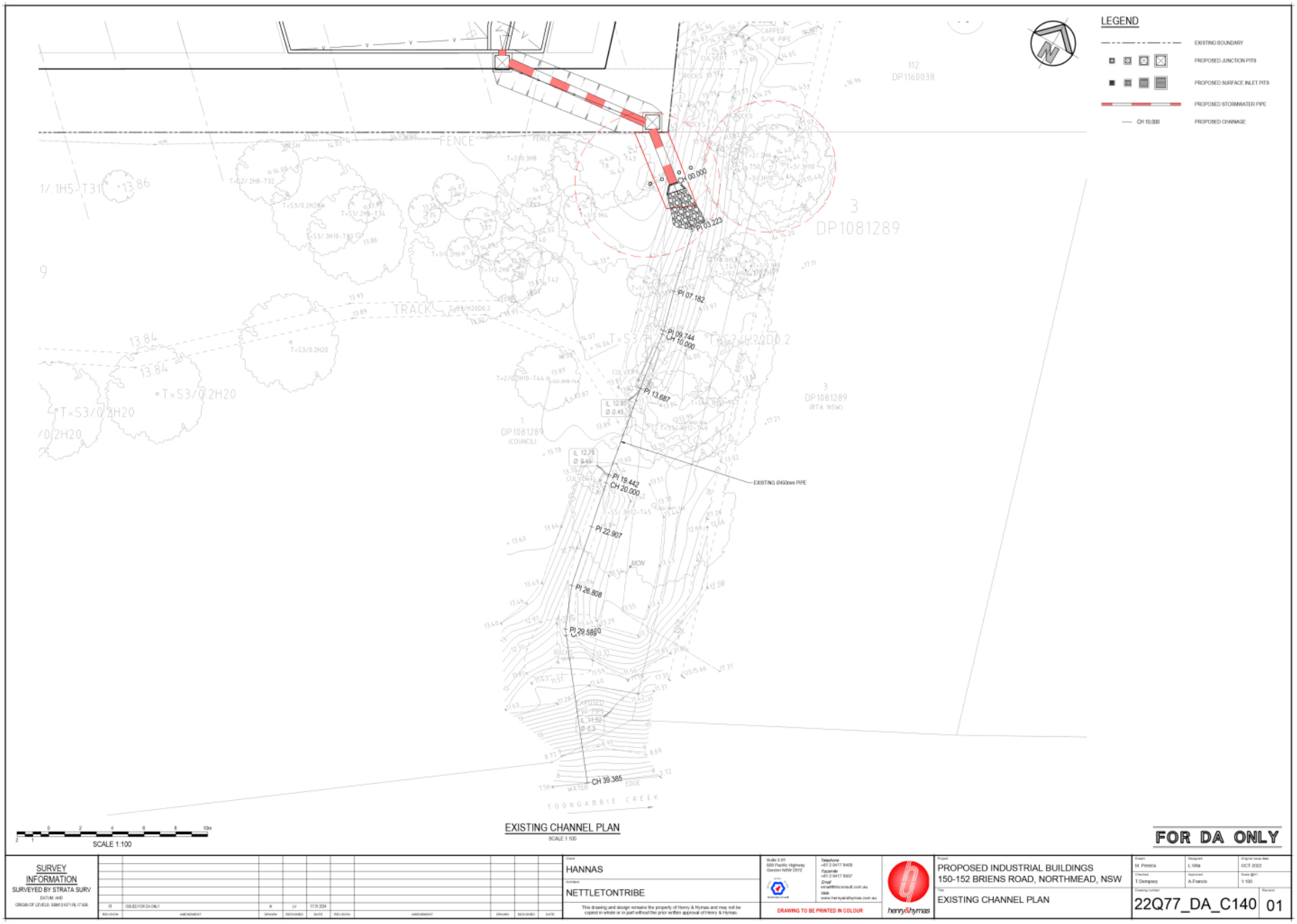
PRELIMINARY

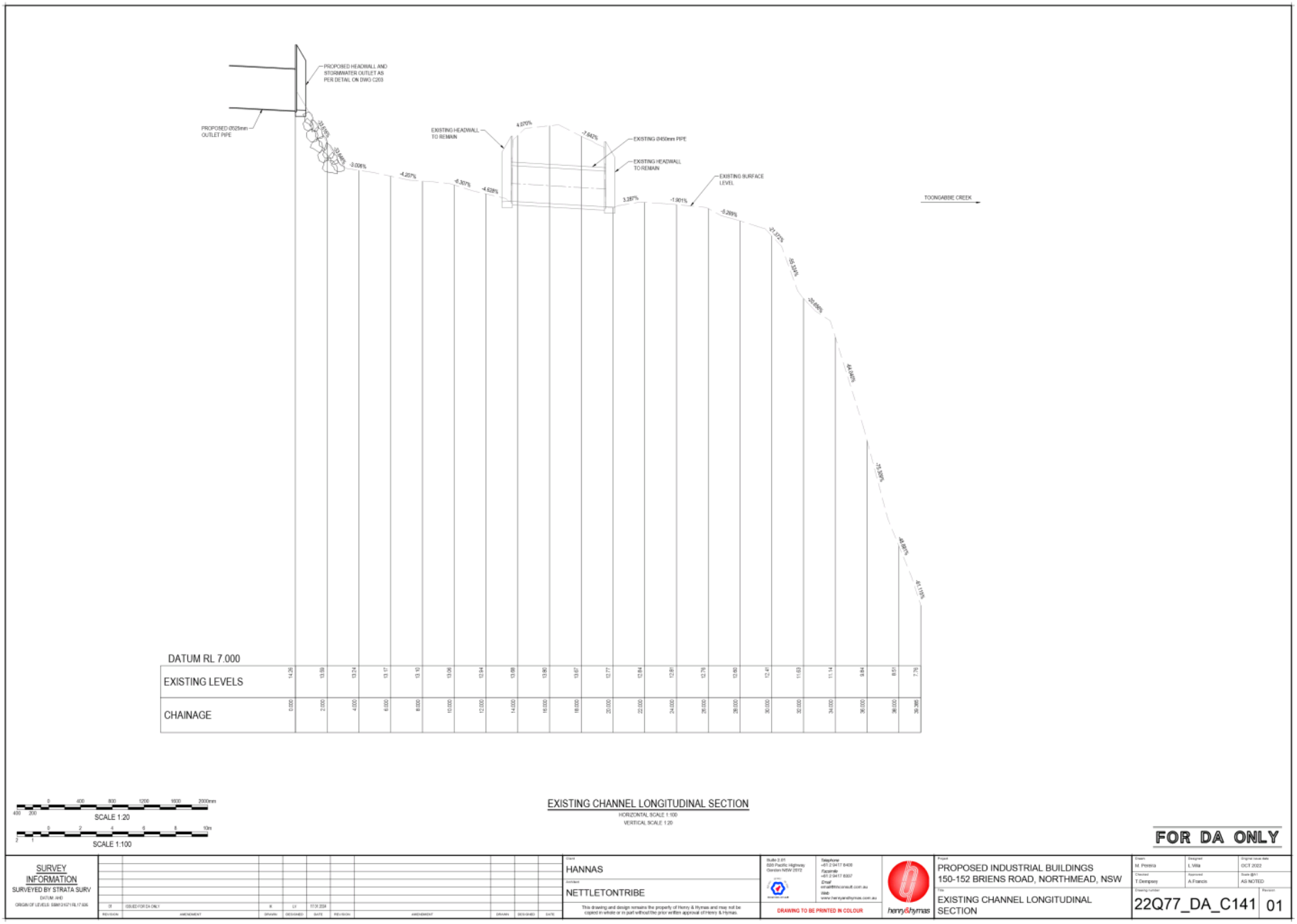
Scale: 1:400 @ A1
Job Number: SS22-5068
Drawing Number: 702
Issue: E

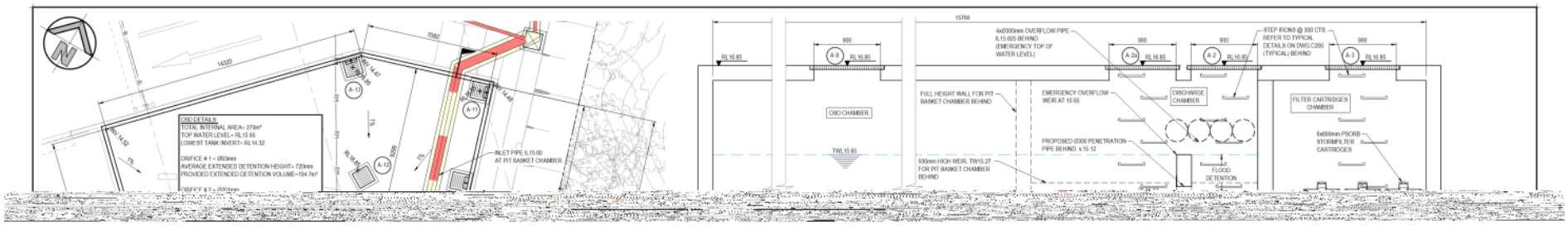
A1


BRIENS ROAD
TOONGABBIE CREEK
MONS ROAD
FFL 12.85
OSD
LEGEND
EXISTING BOUNDARY
PROPOSED RIDGE LINE
PROPOSED VALLEY LINE
PROPOSED JUNCTION PITS
PROPOSED SURFACE INLET PITS
PROPOSED PIT TAG
PROPOSED STORMWATER PIPE
PROPOSED RISING MAIN
PROPOSED SPOT LEVEL
OVERLAND FLOW PATH
PROPOSED FLOOR DRAIN
PROPOSED VERTICAL DROPPER
20ARI (5%AEP) LONGSECTIONS FOR OUTLET PIPE
LONGSECTIONS OSD A-1
LONGSECTIONS OSD A-1 A-1a
LONGSECTIONS OSD A-1a - HW
NOTES:
1. SUBSOIL DRAINAGE FOR BASEMENT WALLS NOT SHOWN AT DA STAGE. THIS TO BE DETAILED AT CC STAGE.
2. ALL BASEMENT WALLS TO BE TANKED AND WATERPROOFED BY STRUCTURAL ENGINEER.
DETAIL PLAN - BASEMENT FLOOR
SCALE 1:200
SCALE 1:200
FOR DA ONLY
SURVEY INFORMATION
HANNAS
NETTLETONTRIBE
PROPOSED INDUSTRIAL BUILDINGS
150-152 BRIENS ROAD, NORTHMEAD, NSW
DETAIL PLAN
BASEMENT FLOOR
22Q77_DA_C100
08


BRIENS ROAD
MONS ROAD
TOONGABBIE CREEK
LEGEND
EXISTING BOUNDARY
PROPOSED RIDGE LINE
PROPOSED VALLEY LINE
ROOF LINE
PROPOSED JUNCTION PITS
PROPOSED SURFACE INLET PITS
PROPOSED PIT TAG
PROPOSED STORMWATER PIPE
EXISTING SPOT LEVEL
PROPOSED SPOT LEVEL
PROPOSED BATTER LINE
PROPOSED SWALE
PROPOSED FLOOR DRAIN
PROPOSED VERTICAL DROPPER
PROPOSED LANDSCAPING WALL
PROPOSED RETAINING WALL
PROPOSED EDGE STRIP
OVERFLOW SWALE SECTION A
SCALE 1:20
DETAIL PLAN - GROUND FLOOR
SCALE 1:200
SCALE 1:20
NOTES:
1. CONTRACTOR TO INVESTIGATE THE PRESENCE OF EXISTING UTILITIES, SIZE AND DEPTH PF ALL IN-GROUND UTILITIES PRIOR TO CONSTRUCTION. SERVICES SHOWN ON THIS DRAWING DEPICTED FROM SERVICES SEARCH PLANS AND CANNOT BE GUARANTEED.
2. ALL STORMWATER PITS TO HAVE Ø100uPVC SLOTTED SUBSOIL PIPES CONNECTED TO THEM. THESE SUBSOILS TO EXTEND 3m UPSTREAM OF THE PIT AT A MINIMUM GRADE.
3. SERVICES SHOWN ON THIS DRAWING ARE DEPICTED FROM SERVICES SEARCH PLANS AND CAN NOT BE GUARANTEED. THE EXACT DEPTH AND LOCATION OF ALL IN-GROUND UTILITIES TO BE DETERMINED BY POT HOLING OR CABLE SEARCH.
4. DOWNPIPE LOCATION AND CONNECTION TO FUTURE HYDRAULIC ENGINEER'S DETAILS.
5. ALL RETAINING WALLS SHOWN ON THESE PLANS WILL REQUIRE SUBSOIL DRAINAGE LINES. THESE WILL BE DOCUMENTED AT THE CC/TENDER STAGE.
6. ALL DISTURBED AREAS WITHIN THE ROAD RESERVE TO BE TOPSOILED WITH MIN. 50mm OF APPROVED TURF UNDERLAY AND TURFED AS SOON AS PRACTICAL TO ENCOURAGE REVEGETATION AND MINIMISE SOIL EROSION FROM THE SITE. REFER TO COUNCIL'S STANDARD DRAWINGS
FOR DA ONLY
SURVEY INFORMATION
SURVEYED BY STRATA SURV
HANNAS
NETTLETONTRIBE
PROPOSED INDUSTRIAL BUILDINGS
150-152 BRIENS ROAD, NORTHMEAD, NSW
DETAIL PLAN
GROUND FLOOR
22Q77_DA_C101
08


LEGEND
EXISTING BOUNDARY
PROPOSED JUNCTION PITS
PROPOSED SURFACE INLET PITS
PROPOSED STORMWATER PIPE
CH 10.000
PROPOSED CHAINAGE
CH 00.000
PI 03.223
PI 07.182
PI 09.744
CH 10.000
PI 13.687
PI 19.442
CH 20.000
PI 22.907
PI 26.808
PI 29.589
CH 39.385
EXISTING Ø450mm PIPE
DP1081289
TRACK
FENCE
TOONGABBIE CREEK
EXISTING CHANNEL PLAN
SCALE 1:100
FOR DA ONLY
SURVEY INFORMATION
SURVEYED BY STRATA SURV
HANNAS
NETTLETONTRIBE
DRAWING TO BE PRINTED IN COLOUR
henry&hymas
PROPOSED INDUSTRIAL BUILDINGS
150-152 BRIENS ROAD, NORTHMEAD, NSW
EXISTING CHANNEL PLAN
22Q77_DA_C140
01


PROPOSED HEADWALL AND STORMWATER OUTLET AS PER DETAIL ON DWG C203
PROPOSED Ø525mm OUTLET PIPE
EXISTING HEADWALL TO REMAIN
EXISTING Ø450mm PIPE
EXISTING HEADWALL TO REMAIN
EXISTING SURFACE LEVEL
TOONGABBIE CREEK
DATUM RL 7.000
EXISTING LEVELS
CHAINAGE
SCALE 1:20
SCALE 1:100
EXISTING CHANNEL LONGITUDINAL SECTION
HORIZONTAL SCALE 1:100
VERTICAL SCALE 1:20
FOR DA ONLY
SURVEY INFORMATION
SURVEYED BY STRATA SURV
ISSUED FOR DA ONLY
HANNAS
NETTLETONTRIBE
DRAWING TO BE PRINTED IN COLOUR
henry&hymas
PROPOSED INDUSTRIAL BUILDINGS
150-152 BRIENS ROAD, NORTHMEAD, NSW
EXISTING CHANNEL LONGITUDINAL SECTION
22Q77_DA_C141
01


OSD DETAILS
TOTAL INTERNAL AREA= 270m²
TOP WATER LEVEL= RL15.65
LOWEST TANK INVERT= RL14.32
ORIFICE # 1 = Ø63mm
AVERAGE EXTENDED DETENTION HEIGHT= 720mm
PROVIDED EXTENDED DETENTION VOLUME=194.7m³
INLET PIPE IL15.60
AT PIT BASKET CHAMBER
OSD CHAMBER
TWL15.65
FULL HEIGHT WALL FOR PIT
BASKET CHAMBER BEHIND
EMERGENCY OVERFLOW
WEIR AT 15.65
DISCHARGE
CHAMBER
FILTER CARTRIDGES
CHAMBER
PROPOSED Ø300 PENETRATION
PIPE BEHIND, IL 15.12
FLOOD
DETENTION

STORMWATER DESIGN SUMMARY

TOTAL SITE AREA: 6490m²

SITE DISCHARGE DIRECTED VIA GRAVITY IN ACCORDANCE WITH COUNCIL REQUIREMENTS .

ON-SITE DETENTION DESIGN SUMMARY

AS PER PARAMATTA DCP 2011, SECTION 3.3.6.1 STORMWATER DRAINAGE, DESIGN PRINCIPLE P7:
"ON-SITE DETENTION (OSD) WILL BE REQUIRED AS OUTLINED IN THE UPPER PARRAMATTA RIVER CATCHMENT TRUST ON-SITE DETENTION HANDBOOK".
THE SPREADSHEET INDICATED BY THE UPPER PARRAMATTA RIVER CATCHMENT TRUST ON-SITE DETENTION HANDBOOK 3RD EDITION HAS BEEN APPLIED TO DETERMINE THE REQUIRED OSD VOLUME FOR THE SITE WITH DROWNED ORIFICE CONDITIONS DUE TO THE 100YR FLOOD FOR THE SITE.
100YR FLOOD LEVEL: RL14.80m AHD
DROWNED ORIFICE CONDITIONS ADJUSTMENTS HAVE BEEN IMPLEMENTED AS PER THE UPPER PARRAMATTA RIVER CATCHMENT TRUST ON-SITE DETENTION HANDBOOK (4TH ED.), SECTION 6.4 DROWNED OUTLETS, FIGURE 6.3(b)

On-Site Detention Calculation Sheet for Upper Parramatta River Catchment
Non-HED Secondary Outlet
(Due to Elevated Downstream 100 yr ARI Flood Level)

Project:	**Industrial development**
Site Address	**150-152 Briens Road, Northmead NSW**
Job No:	**22Q77**
Designer:	**LV/TD**
Telephone:	**(02) 9417 8400**

Site Data

OSD Area:	Upper Parramatta River Catchment					
L.G.A	Parramatta City Council					
Site Area	0.649	ha	6,490	m^2		
Total Roof Area	0.3512	ha	3,512	m^2		
Area of Site draining to OSD Storage	0.5801	ha	5,801	m^2	Satisfactory	
Residual Site Area (Lot Area - Roof Area)	0.298	ha				
Area Bypassing Storage	0.0689	ha				
Area Bypassing / Residual Site Area	23.1%				Satisfactory	30% Max
No. of Dwellings on Site	1				Satisfactory	
Site Area per Dwelling	0.649	ha				
Roof Area per Dwelling	0.351	ha				

Basic OSD Parameters

	Extended Detention			Detention		
Basic SSR Vols	Ext Detention Storage	300	m^3/ha	Total Storage	520	m^3/ha
Basic SRDs	Primary Outlet	40	L/s/ha	Secondary Outlet	150	L/s/ha

OSD Tank Bypass

Residual Lot Capture in OSD Tank	77%			
Adjusted SRDs	33	L/s/ha	104	L/s/ha

OSD Calculations

	Extended Detention			Detention		
Basic SSR Volume	Ext Detention Storage	194.70	m^3	Total Storage	337.48	m^3
Total Rainwater Tank Credits		0.00	m^3		0.00	m^3
Storage Volume				Total	337.48	m^3
Storage Volume	Ext Detention Storage	194.70	m^3	Flood Detention Storage	142.78	m^3
OSD Discharges	Primary Outlet	21.46	L/s	Secondary Outlet	67.32	L/s
RL of Top Water Level of Storage		15.120	m		15.650	m
RL of Orifice Centre-line		14.320	m		15.120	m
Number of Orifices		1			1	
Estimated Downstream Flood Level		14.32	1.5 yr ARI		14.80	100 yr ARI
Downstream FL - RL of Orifice Cente-line		0.00	Satisfactory	Satisfactory	-0.32	
Design Head to Orifice Centre		0.800	m	TWL Detn Storage - RL Orifice	0.530	m
Calculated Orifice Diameter		107	mm Satisfactory	Satisfactory	210	mm

FLOW OF 1x CARTRIDGE WITH PSORB = 0.9L/s
FLOW FOR 6x CARTRIDGES = 0.9x6=5.41L/s

THEREFORE, REDUCED FLOW=21.46-5.41=16.05L/s

FLOW OF 1x CARTRIDGE WITH PSORB = 0.9L/s
FLOW FOR 6x CARTRIDGES = 0.9x6=5.41L/s

THEREFORE, REDUCED FLOW=67.32-5.41=61.91L/s

ADJUSTED ORIFICE SIZE FOR REDUCED FLOW AS CALCULATED ABOVE

$$A = \frac{Q}{0.6\sqrt{2gh}} = \frac{0.01605}{0.6\sqrt{2x9.81x0.8}} = 6.73x10^{-3}m^2$$

$$\varnothing = \sqrt{\frac{4A}{\pi}} = \sqrt{\frac{4x6.73x10^{-3}}{\pi}} = 0.093m = 93mm$$

ADJUSTED ORIFICE SIZE FOR REDUCED FLOW AS CALCULATED ABOVE

$$A = \frac{Q}{0.6\sqrt{2gh}} = \frac{0.06191}{0.6\sqrt{2x9.81x0.53}} = 0.032m^2$$

$$\varnothing = \sqrt{\frac{4A}{\pi}} = \sqrt{\frac{4x0.032}{\pi}} = 0.201m = 201mm$$

0 400 800 1200 1600 2000mm
400 200
SCALE 1:20

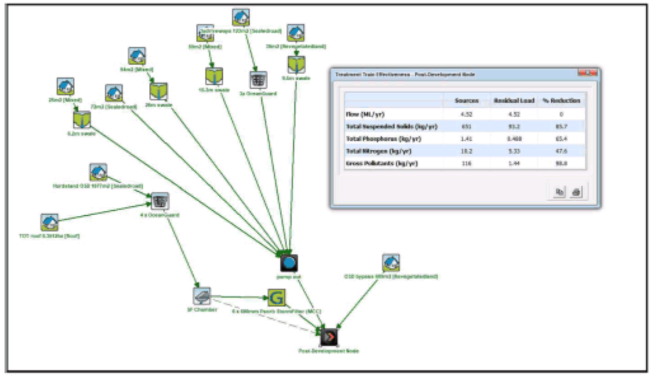
WATER SENSITIVE URBAN DESIGN SUMMARY

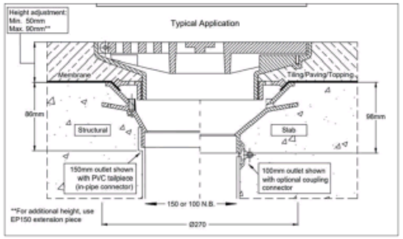
A STORMWATER MANAGEMENT PLAN HAS BEEN PREPARE TO LIMIT AND ELIMINATE ANY ADVERSE AFFECT ON THE ADJACENT ECOSYSTEM RESULTING FROM THE PROPOSED DEVELOPMENT. A MUSCI MODEL HAS BEEN PREPARED TO DETERMINE THE EFFECTIVENESS OF THE WATER QUALITY TRETMENT DEVICES AT REACHING THE REMOVAL RATES TARGETS SET IN THE CITY OF PARRAMATTA DCP 2011, SECTION 3.3.6.

PROPOSED TREATMENT DEVICES:
- 4x OCEANGUARD PIT BASKETS
- 6x 690 STORMFILTERS

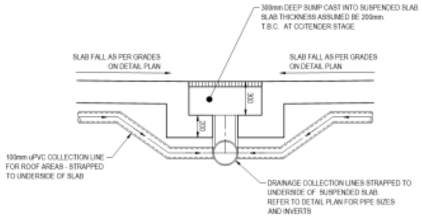
REFER TO RESULTS SUMMARY IN SCREENSHOT BELOW

POLLUTANT	SOURCES	RESIDUAL LOAD	% REDUCTION	% TARGET
TOTAL SUSPENDED SOLIDS	634	88	86.1	85
TOTAL PHOSPHORUS	1.36	0.498	63.5	60
TOTAL NITROGEN	9.91	5.32	46.3	45
GROSS POLLUTANTS	114	1.41	98.8	90

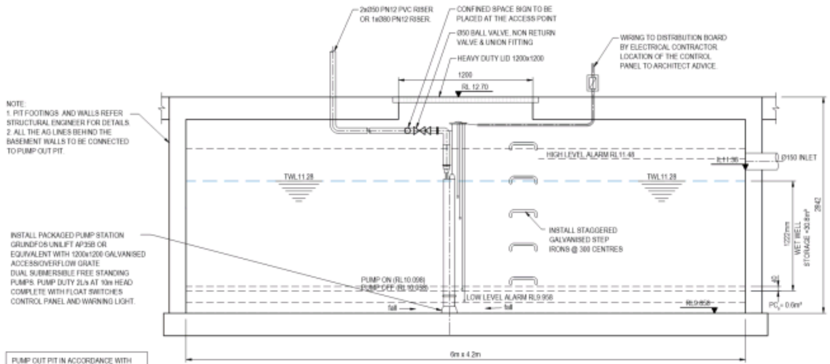




ROUND FLOOR DRAIN (FD)
N.T.S



TYPICAL SUMP PIT (SP) DETAIL
IN SUSPENDED SLAB
SCALE 1:20



DOUBLE PUMP STORMWATER PIT
SCALE: N.T.S.

PUMP OUT PIT IN ACCORDANCE WITH COUNCIL'S DEVELOPMENT ENGINEERING STANDARDS AND AS3500.3

BASEMENT PUMP-OUT PIT CALCULATIONS

EXPOSED AREA = 465m²

SUMP DESIGNED TO CATER FOR 10 YEAR ARI STORM EVENT, 2 HOUR DURATION IN ACCORDANCE WITH AS3500.3-2015.

RAINFALL INTENSITY 10 YR ARI 2 HOUR RAINFALL INTENSITY, I=36.9463 mm/hr.

FLOW CATCHMENT = CIA/3600
= (1 x 36.9463 x 465)/3600
= 4.77L/s

VOLUME OF STORM OVER A 2 HOUR PERIOD V=(4.77/1000) x 2 x 60 x60
V= 34.4m³

VOLUME TO BE PUMPED IN 0.5HOUR PERIOD IN ACCORDANCE WITH AS3500.3 (SECTION 8.3.6) WITH A 2L/s PUMPING RATE
V = 0.002 x 0.5 x 60 x 60
V = 3.6m³

THEREFORE WET WELL STORAGE = 34.4 - 3.6 = 30.8m³

FOR DA ONLY

SURVEY INFORMATION
SURVEYED BY STRATA SURV
DATUM: AHD
ORIGIN OF LEVELS: SSM131671 RL17.606

REVISION	AMENDMENT	DRAWN	DESIGNED	DATE
07	ISSUED FOR DA ONLY	MB	LV	17.01.2024
06	ISSUED FOR DA ONLY	AFe	LV	10.10.2023
05	ISSUED FOR DA ONLY	MB	LV	08.08.2023
04	ISSUED FOR DA ONLY	MB	LV	19.06.2023
03	ISSUED FOR DA ONLY	MB	LV	12.04.2023
02	ISSUED FOR DA ONLY	MB	LV	13.12.2022
01	ISSUED FOR PRELIMINARY	MP	LV	02.12.2022

Client: HANNAS
Architect: NETTLETONTRIBE

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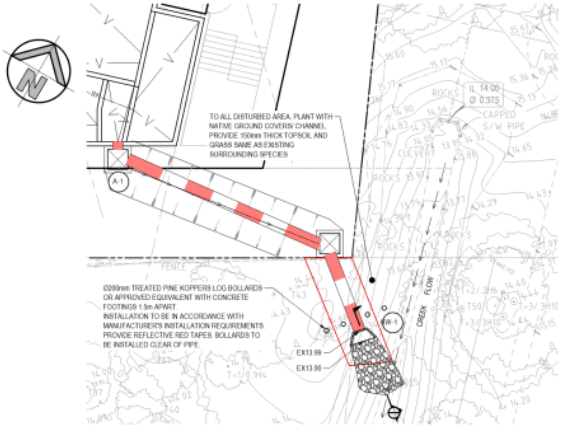
DRAWING TO BE PRINTED IN COLOUR

henry&hymas

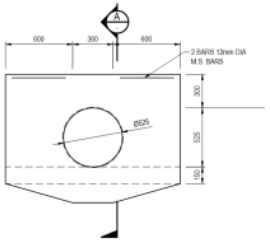
Project: PROPOSED INDUSTRIAL BUILDINGS 150-152 BRIENS ROAD, NORTHMEAD, NSW
Title: STORMWATER DETAILS AND SECTIONS

Drawn	Designed	Original issue date
M. Pereira	L.Villa	OCT 2022
Checked	**Approved**	**Scale @A1**
T.Dempsey	A.Francis	AS NOTED

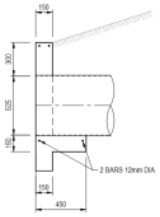
Drawing number: 22Q77_DA_C202 Revision: 07



PLAN VIEW
SCALE 1:100

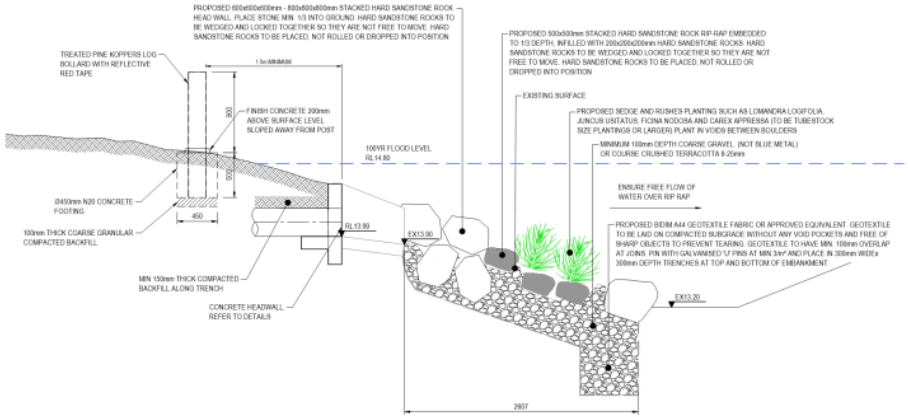


SECTIONAL ELEVATION
SCALE 1:20

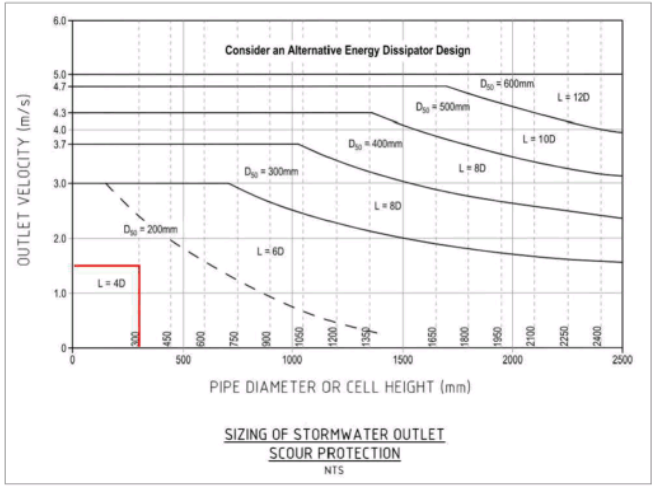


SECTION A
SCALE: 1:20

NOTES:
- MINIMUM COVER TO ALL PIPES TO BE 600mm UNDER ROADS AND 450mm ELSEWHERE.
- CONCRETE TO BE A MINIMUM OF N32 IN ACCORDANCE WITH AS1012, AS1379-2007 (R2017) AND AS3600-2018.
- SELECTED GRANULAR MATERIAL BACKFILL SHALL BE PLACED TO FILL ALL EXCAVATED VOIDS (REFER TO AS/NZS3725:2007)



STORMWATER OUTLET TO NATURAL WATERWAY DETAIL
1:25



SIZING OF STORMWATER OUTLET SCOUR PROTECTION
NTS

SIZING OF STORMWATER OTLET SCOUR PROTECTION

V=1.49m/s MAX (MAX VELOCITY IS OBTAINED FROM DRAINS MODEL 22Q77 DRAINS Rev 01.drn)
W(min)= 3D= 3*0.3= 0.9m, ADOPTED W=1m
L(min)= 4D= 4*0.3= 1.2m, ADOPTED W=1.5m

NOTE:
RIP RAP SIZING CHART OBTAINED FROM BLACKTOWN CITY COUNCIL W.S.U.D. STANDARD DRAWINGS AND DETAILS. STONE SIZING HAS BEEN OBTAINED FROM CITY OF PARRAMATTA COUNCIL STANDARD DRAWING D5-48.

SCALE 1:20
SCALE 1:25
SCALE 1:100

FOR DA ONLY

SURVEY INFORMATION
SURVEYED BY STRATA SURV
DATUM: AHD
ORIGIN OF LEVELS: SSM 31671 RL17.655

REV	AMENDMENT	DRAWN	DESIGNED	DATE
03	ISSUED FOR DA ONLY	MB	LV	17.01.2023
02	ISSUED FOR DA ONLY	MB	LV	30.08.2022
01	ISSUED FOR DA ONLY	MP	LV	28.03.2021

Client: HANNAS
Architect: NETTLETONTRIBE

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DRAWING TO BE PRINTED IN COLOUR

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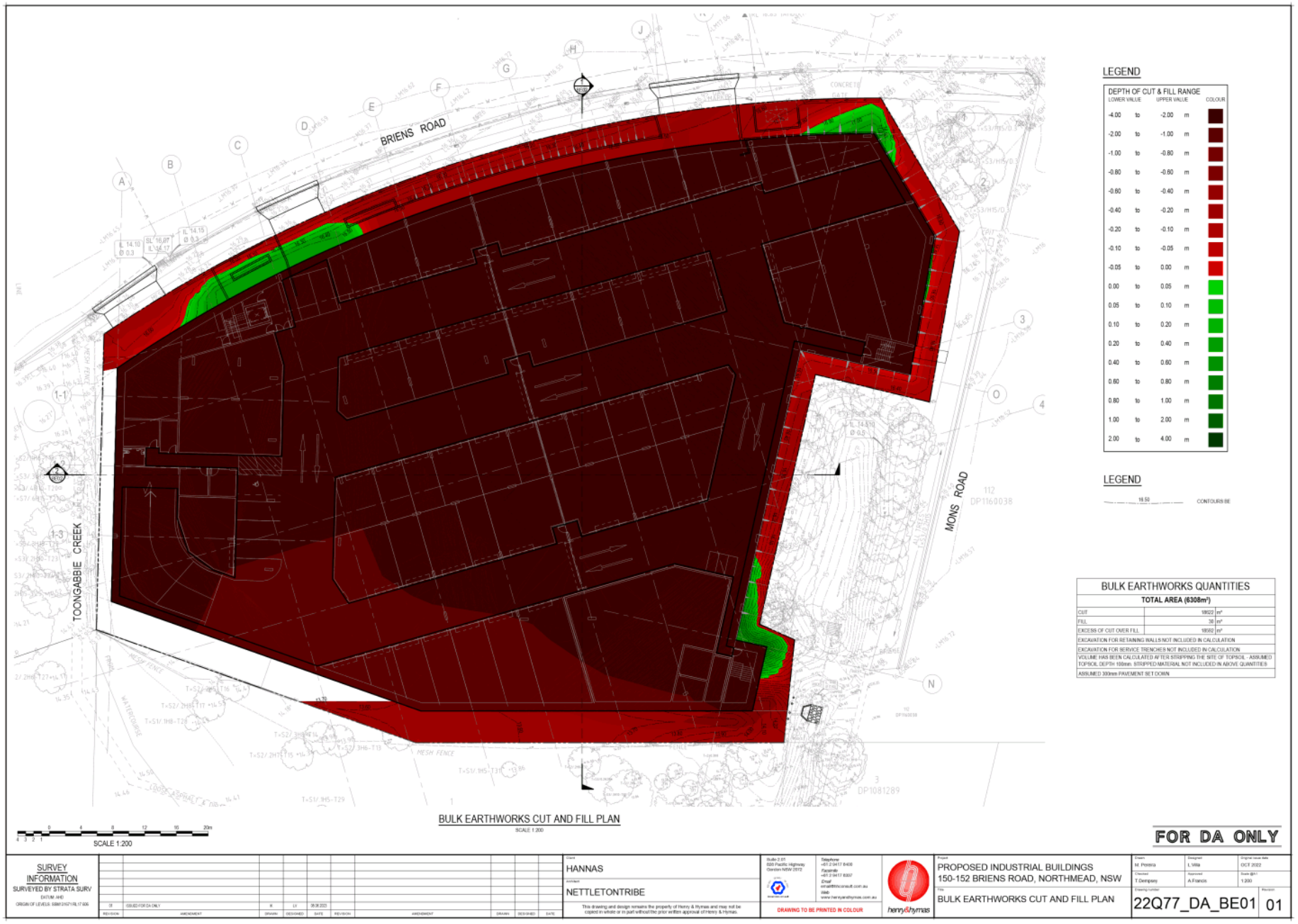
Project: PROPOSED INDUSTRIAL BUILDINGS
150-152 BRIENS ROAD, NORTHMEAD, NSW
Title: STORMWATER OUTLET DETAILS
Drawn: M. Pereira | Designed: L. Villa | Original Issue date: OCT 2022
Checked: T. Dempsey | Approved: A. Francis | Scale @ A1: AS NOTED
Drawing number: 22Q77_DA_C203 | Revision: 03


BRIENS ROAD
TOONGABBIE CREEK
MONS ROAD
LEGEND
DEPTH OF CUT & FILL RANGE
LOWER VALUE UPPER VALUE COLOUR
-4.00 to -2.00 m
-2.00 to -1.00 m
-1.00 to -0.80 m
-0.80 to -0.60 m
-0.60 to -0.40 m
-0.40 to -0.20 m
-0.20 to -0.10 m
-0.10 to -0.05 m
-0.05 to 0.00 m
0.00 to 0.05 m
0.05 to 0.10 m
0.10 to 0.20 m
0.20 to 0.40 m
0.40 to 0.60 m
0.60 to 0.80 m
0.80 to 1.00 m
1.00 to 2.00 m
2.00 to 4.00 m
LEGEND
CONTOURS @0.5
BULK EARTHWORKS QUANTITIES
TOTAL AREA (6308m²)
CUT 18922 m³
FILL 38 m³
EXCESS OF CUT OVER FILL 18883 m³
EXCAVATION FOR RETAINING WALLS NOT INCLUDED IN CALCULATION
EXCAVATION FOR SERVICE TRENCHES NOT INCLUDED IN CALCULATION
VOLUME HAS BEEN CALCULATED AFTER STRIPPING THE SITE OF TOPSOIL - ASSUMED TOPSOIL DEPTH 100mm. STRIPPED MATERIAL NOT INCLUDED IN ABOVE QUANTITIES
ASSUMED 300mm PAVEMENT SET DOWN
BULK EARTHWORKS CUT AND FILL PLAN
SCALE 1:200
SCALE 1:200
FOR DA ONLY
SURVEY INFORMATION
SURVEYED BY STRATA SURV
DATUM: AHD
ORIGIN OF LEVELS: SSM 21621 RL 17.606
01 ISSUED FOR DA ONLY K LT 26.06.2023
HANNAS
NETTLETONTRIBE
DRAWING TO BE PRINTED IN COLOUR
henry&hymas
PROPOSED INDUSTRIAL BUILDINGS
150-152 BRIENS ROAD, NORTHMEAD, NSW
BULK EARTHWORKS CUT AND FILL PLAN
M. Pereira
L. Villa
OCT 2022
T. Dempsey
A. Francis
1:200
22Q77_DA_BE01
01

SCALE 1:200

FOR DA ONLY

SURVEY INFORMATION
SURVEYED BY STRATA SURV
DATUM: AHD
ORIGIN OF LEVELS: SSM 21621 RL 17.606

REVISION	AMENDMENT	DRAWN	DESIGNED	DATE
01	ISSUED FOR DA ONLY	IK	LY	26.06.2023

CLIENT: HANNAS
ARCHITECT: NETTLETONTRIBE

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DRAWING TO BE PRINTED IN COLOUR

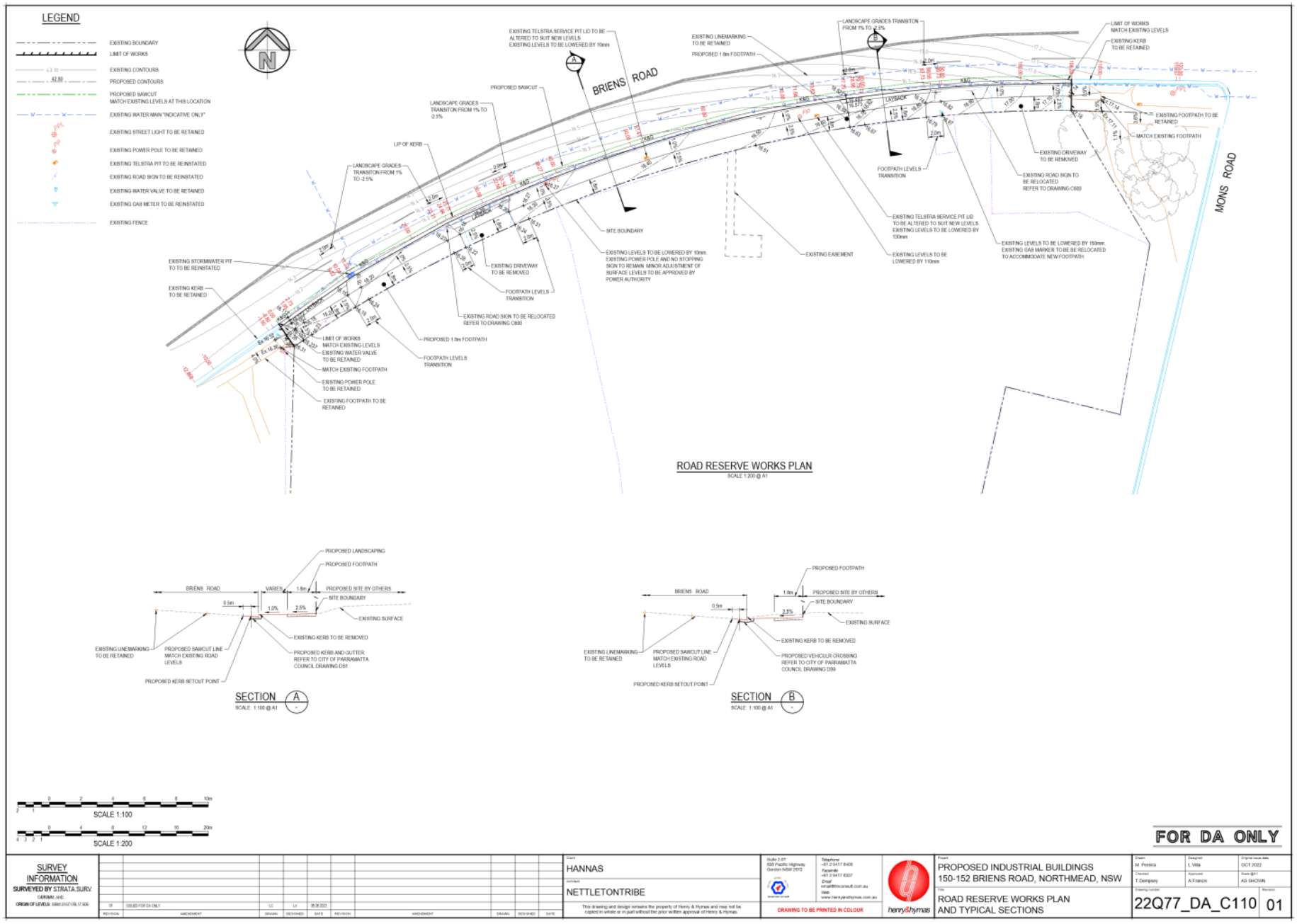
henry&hymas

PROJECT: PROPOSED INDUSTRIAL BUILDINGS
150-152 BRIENS ROAD, NORTHMEAD, NSW

TITLE: BULK EARTHWORKS SECTIONS

Drawn	Designed	Original Issue date
M. Pereira	L.Villa	OCT 2022
Checked	Approved	Scale @A1
T.Dempsey	A.Francis	1:200

Drawing number: 22Q77_DA_BE02
Revision: 01


LEGEND
EXISTING BOUNDARY
LIMIT OF WORKS
EXISTING CONTOURS
PROPOSED CONTOURS
PROPOSED SAWCUT MATCH EXISTING LEVELS AT THIS LOCATION
EXISTING WATER MAIN "INDICATIVE ONLY"
EXISTING STREET LIGHT TO BE RETAINED
EXISTING POWER POLE TO BE RETAINED
EXISTING TELSTRA PIT TO BE REINSTATED
EXISTING ROAD SIGN TO BE REINSTATED
EXISTING WATER VALVE TO BE RETAINED
EXISTING GAS METER TO BE REINSTATED
EXISTING FENCE
BRIENS ROAD
MONS ROAD
ROAD RESERVE WORKS PLAN
SCALE 1:200 @ A1
SECTION A
SCALE: 1:100 @ A1
SECTION B
SCALE: 1:100 @ A1
SCALE 1:100
SCALE 1:200
FOR DA ONLY
SURVEY INFORMATION
HANNAS
NETTLETONTRIBE
PROPOSED INDUSTRIAL BUILDINGS
150-152 BRIENS ROAD, NORTHMEAD, NSW
ROAD RESERVE WORKS PLAN AND TYPICAL SECTIONS
22Q77_DA_C110
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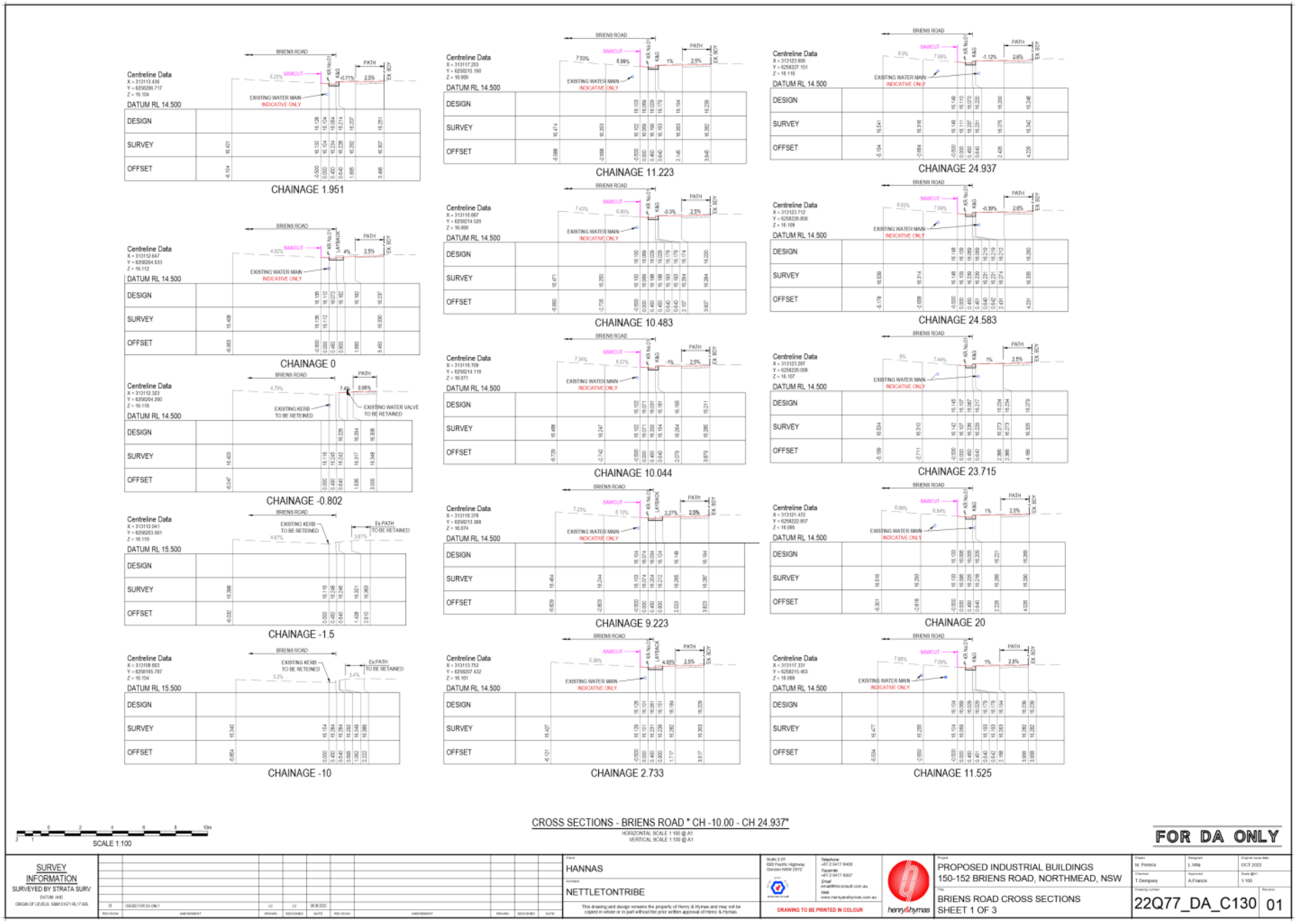
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CHAINAGE 11.223
CHAINAGE 24.937
CHAINAGE 0
CHAINAGE 10.483
CHAINAGE 24.583
CHAINAGE -0.802
CHAINAGE 10.044
CHAINAGE 23.715
CHAINAGE -1.5
CHAINAGE 9.223
CHAINAGE 20
CHAINAGE -10
CHAINAGE 2.733
CHAINAGE 11.525
SCALE 1:100
CROSS SECTIONS - BRIENS ROAD * CH -10.00 - CH 24.937"
HORIZONTAL SCALE 1:100 @ A1
VERTICAL SCALE 1:100 @ A1
FOR DA ONLY
SURVEY INFORMATION
SURVEYED BY STRATA SURV
HANNAS
NETTLETONTRIBE
PROPOSED INDUSTRIAL BUILDINGS
150-152 BRIENS ROAD, NORTHMEAD, NSW
BRIENS ROAD CROSS SECTIONS
SHEET 1 OF 3
22Q77_DA_C130
01
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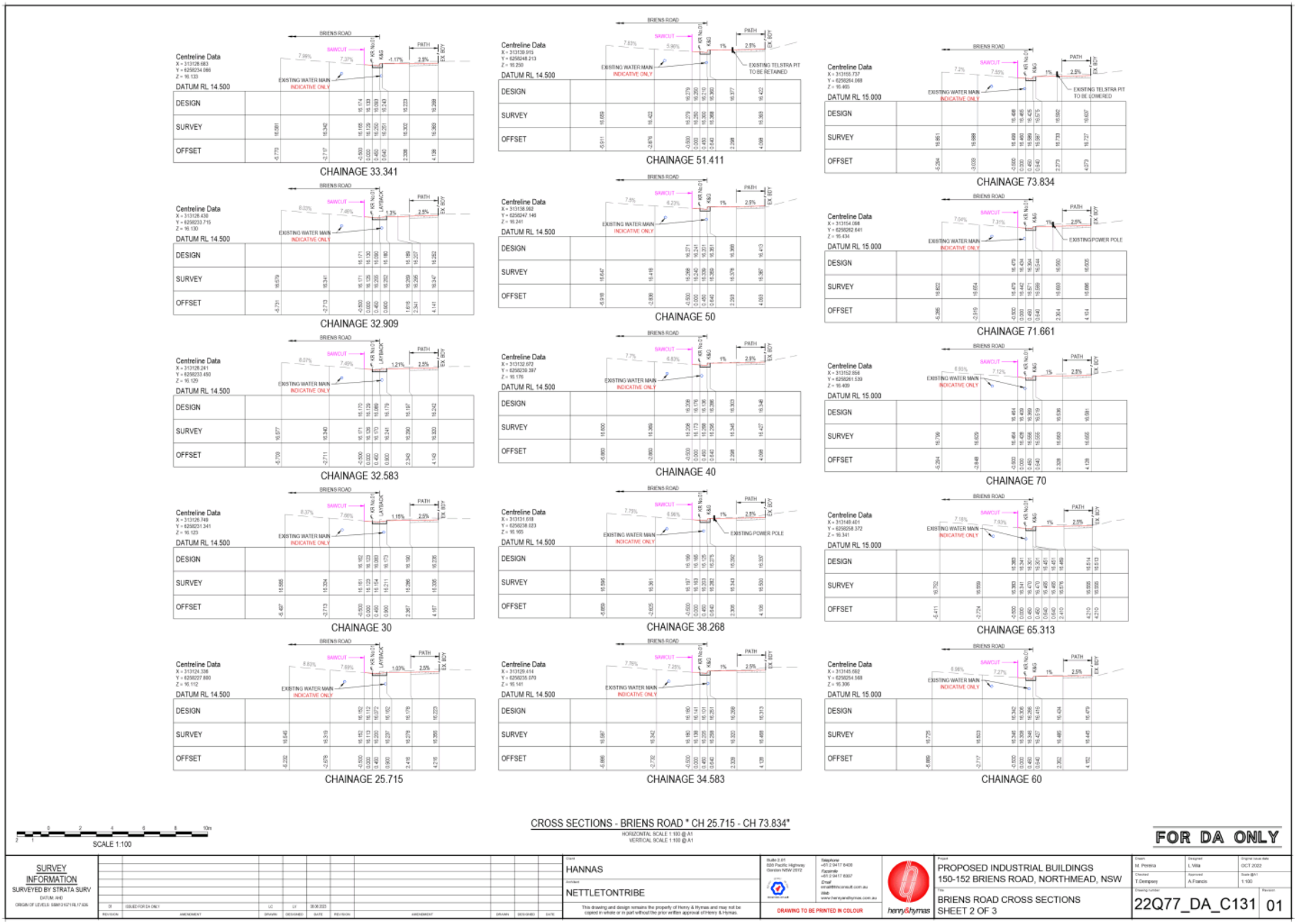
CHAINAGE 33.341
CHAINAGE 51.411
CHAINAGE 73.834
CHAINAGE 32.909
CHAINAGE 50
CHAINAGE 71.661
CHAINAGE 32.583
CHAINAGE 40
CHAINAGE 70
CHAINAGE 30
CHAINAGE 38.268
CHAINAGE 65.313
CHAINAGE 25.715
CHAINAGE 34.583
CHAINAGE 60
CROSS SECTIONS - BRIENS ROAD * CH 25.715 - CH 73.834*
HORIZONTAL SCALE 1:100 @ A1
VERTICAL SCALE 1:100 @ A1
SCALE 1:100
FOR DA ONLY
SURVEY INFORMATION
HANNAS
NETTLETONTRIBE
PROPOSED INDUSTRIAL BUILDINGS
150-152 BRIENS ROAD, NORTHMEAD, NSW
BRIENS ROAD CROSS SECTIONS
SHEET 2 OF 3
22Q77_DA_C131
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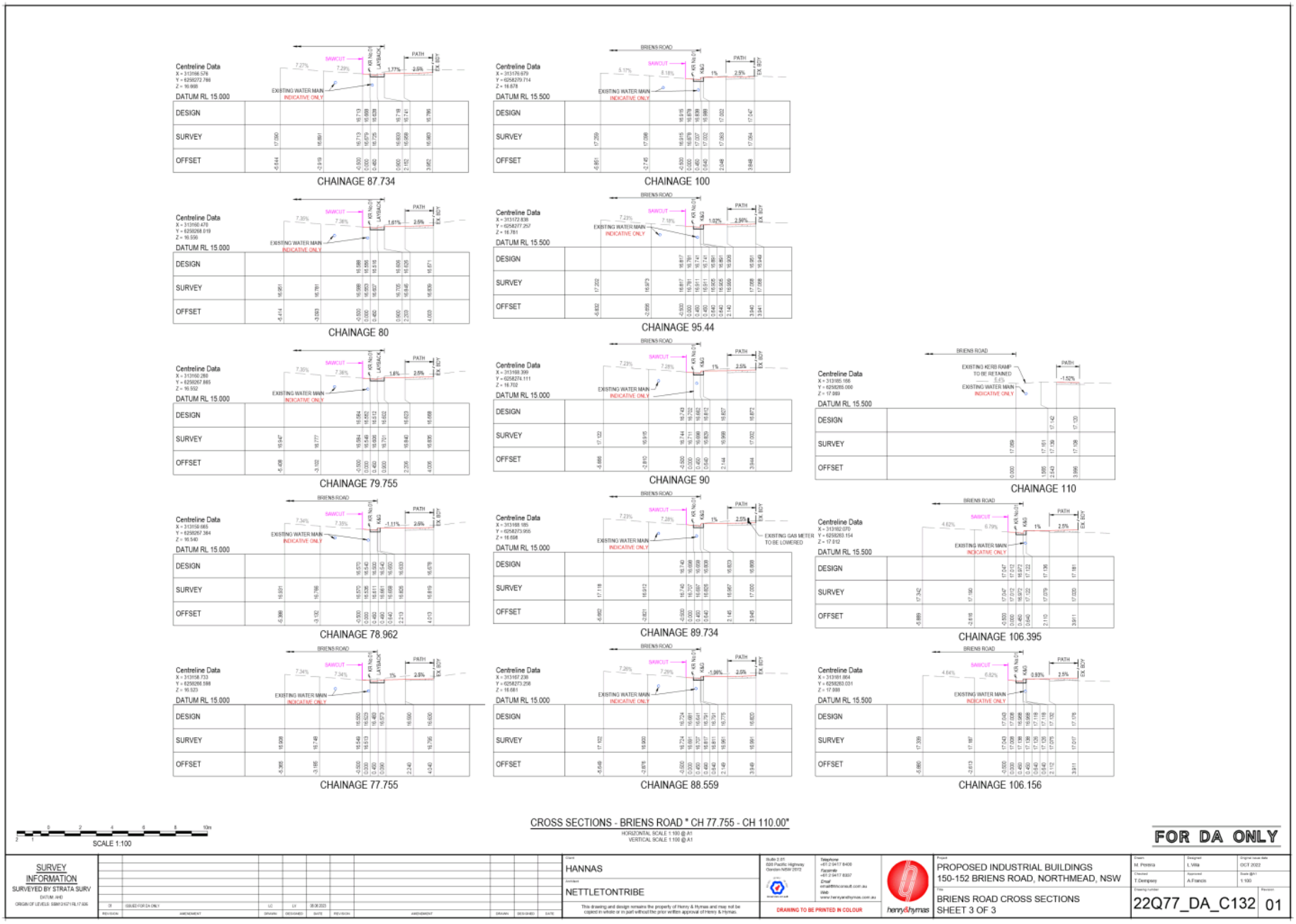
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CHAINAGE 100
CHAINAGE 80
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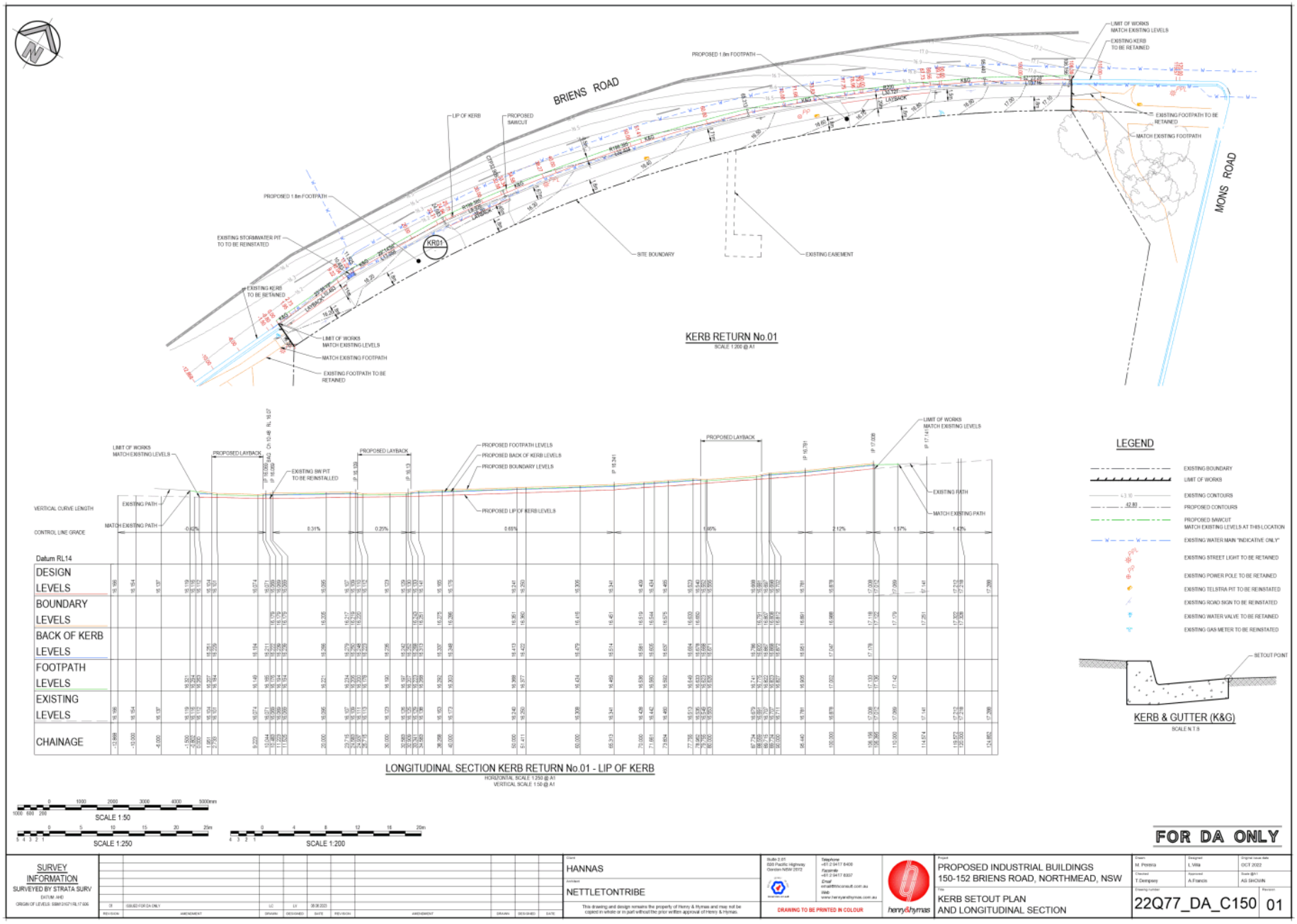
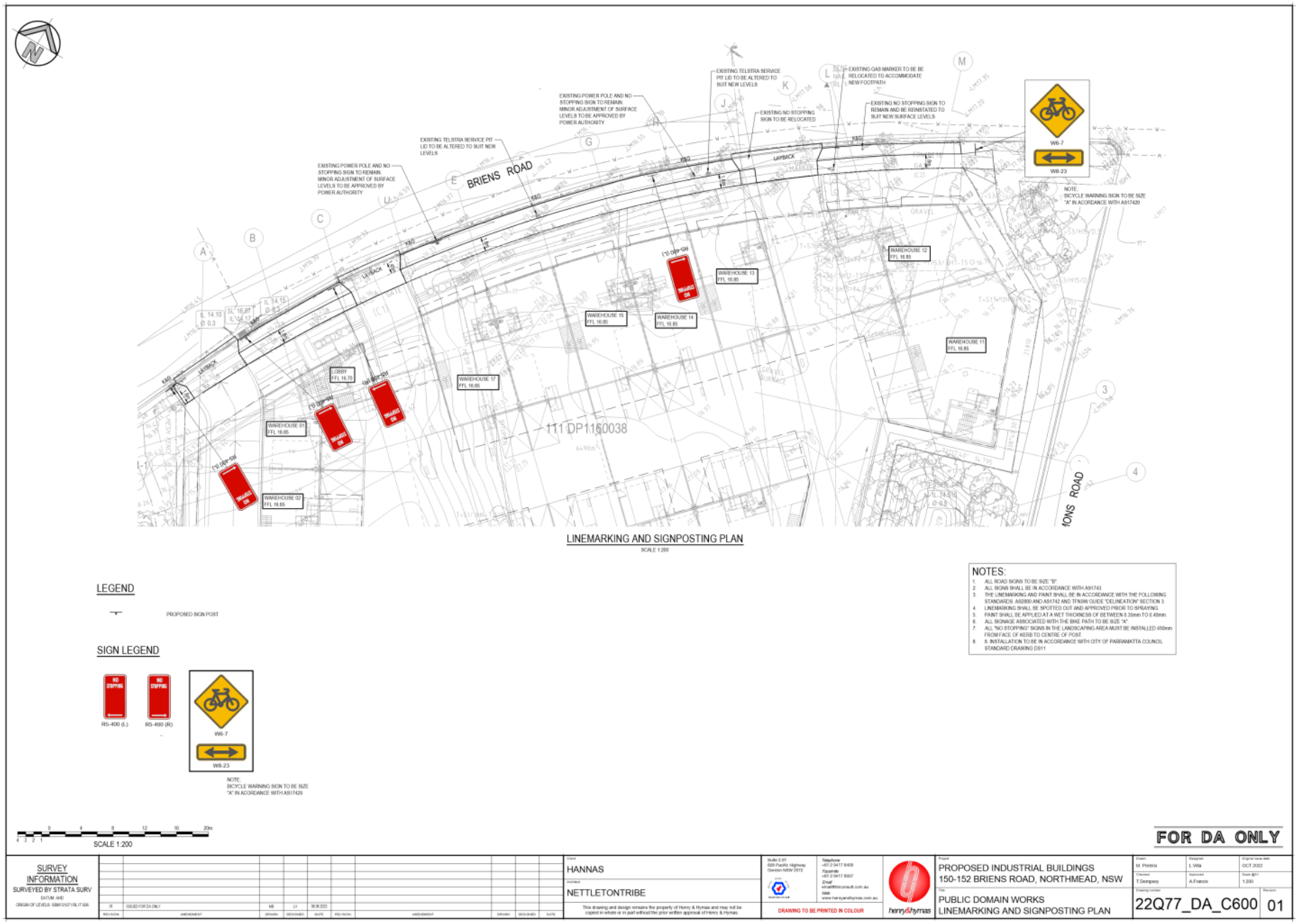
CHAINAGE 79.755
CHAINAGE 90
CHAINAGE 110
CHAINAGE 78.962
CHAINAGE 89.734
CHAINAGE 106.395
CHAINAGE 77.755
CHAINAGE 88.559
CHAINAGE 106.156
CROSS SECTIONS - BRIENS ROAD * CH 77.755 - CH 110.00*
HORIZONTAL SCALE 1:100 @ A1
VERTICAL SCALE 1:100 @ A1
SCALE 1:100
FOR DA ONLY
SURVEY INFORMATION
SURVEYED BY STRATA SURV
HANNAS
NETTLETONTRIBE
PROPOSED INDUSTRIAL BUILDINGS
150-152 BRIENS ROAD, NORTHMEAD, NSW
BRIENS ROAD CROSS SECTIONS
SHEET 3 OF 3
22Q77_DA_C132
01
DRAWING TO BE PRINTED IN COLOUR


BRIENS ROAD
MONS ROAD
PROPOSED 1.8m FOOTPATH
LIP OF KERB
PROPOSED SAWCUT
EXISTING STORMWATER PIT TO TO BE REINSTATED
KR01
SITE BOUNDARY
EXISTING EASEMENT
EXISTING KERB TO BE RETAINED
LIMIT OF WORKS MATCH EXISTING LEVELS
MATCH EXISTING FOOTPATH
EXISTING FOOTPATH TO BE RETAINED
KERB RETURN No.01
SCALE 1:200 @ A1
PROPOSED LAYBACK
EXISTING SW PIT TO BE REINSTALLED
PROPOSED FOOTPATH LEVELS
PROPOSED BACK OF KERB LEVELS
PROPOSED BOUNDARY LEVELS
PROPOSED LIP OF KERB LEVELS
EXISTING PATH
MATCH EXISTING PATH
VERTICAL CURVE LENGTH
CONTROL LINE GRADE
Datum RL14
DESIGN LEVELS
BOUNDARY LEVELS
BACK OF KERB LEVELS
FOOTPATH LEVELS
EXISTING LEVELS
CHAINAGE
LONGITUDINAL SECTION KERB RETURN No.01 - LIP OF KERB
HORIZONTAL SCALE 1:250 @ A1
VERTICAL SCALE 1:50 @ A1
LEGEND
EXISTING BOUNDARY
LIMIT OF WORKS
EXISTING CONTOURS
PROPOSED CONTOURS
PROPOSED SAWCUT MATCH EXISTING LEVELS AT THIS LOCATION
EXISTING WATER MAIN "INDICATIVE ONLY"
EXISTING STREET LIGHT TO BE RETAINED
EXISTING POWER POLE TO BE RETAINED
EXISTING TELSTRA PIT TO BE REINSTATED
EXISTING ROAD SIGN TO BE REINSTATED
EXISTING WATER VALVE TO BE RETAINED
EXISTING GAS METER TO BE REINSTATED
SETOUT POINT
KERB & GUTTER (K&G)
SCALE N.T.S
SCALE 1:50
SCALE 1:250
SCALE 1:200
FOR DA ONLY
SURVEY INFORMATION
SURVEYED BY STRATA SURV
ISSUED FOR DA ONLY
HANNAS
NETTLETONTRIBE
DRAWING TO BE PRINTED IN COLOUR
henry&hymas
PROPOSED INDUSTRIAL BUILDINGS
150-152 BRIENS ROAD, NORTHMEAD, NSW
KERB SETOUT PLAN AND LONGITUDINAL SECTION
22Q77_DA_C150
01



LINEMARKING AND SIGNPOSTING PLAN

SCALE 1:200

LEGEND

PROPOSED SIGN POST

SIGN LEGEND

R5-400 (L) R5-400 (R) W6-7 W8-23

NOTE: BICYCLE WARNING SIGN TO BE SIZE "A" IN ACCORDANCE WITH AS1742

NOTES:

1. ALL ROAD SIGNS TO BE SIZE 'B'.
2. ALL SIGNS SHALL BE IN ACCORDANCE WITH AS1743.
3. THE LINEMARKING AND PAINT SHALL BE IN ACCORDANCE WITH THE FOLLOWING STANDARDS: AS2890 AND AS1742 AND TFNSW GUIDE 'DELINEATION' SECTION 3.
4. LINEMARKING SHALL BE SPOTTED OUT AND APPROVED PRIOR TO SPRAYING.
5. PAINT SHALL BE APPLIED AT A WET THICKNESS OF BETWEEN 0.35mm TO 0.40mm.
6. ALL SIGNAGE ASSOCIATED WITH THE BIKE PATH TO BE SIZE "A".
7. ALL "NO STOPPING" SIGNS IN THE LANDSCAPING AREA MUST BE INSTALLED 450mm FROM FACE OF KERB TO CENTRE OF POST.
8. INSTALLATION TO BE IN ACCORDANCE WITH CITY OF PARRAMATTA COUNCIL STANDARD DRAWING D511

SCALE 1:200

FOR DA ONLY

SURVEY INFORMATION
SURVEYED BY STRATA SURV
DATUM: AHD
ORIGIN OF LEVELS: SSM 21621 RL 17.606

REVISION	AMENDMENT	DRAWN	DESIGNED	DATE
01	ISSUED FOR DA ONLY	MB	LY	26.08.2022

CLIENT: HANNAS
ARCHITECT: NETTLETONTRIBE

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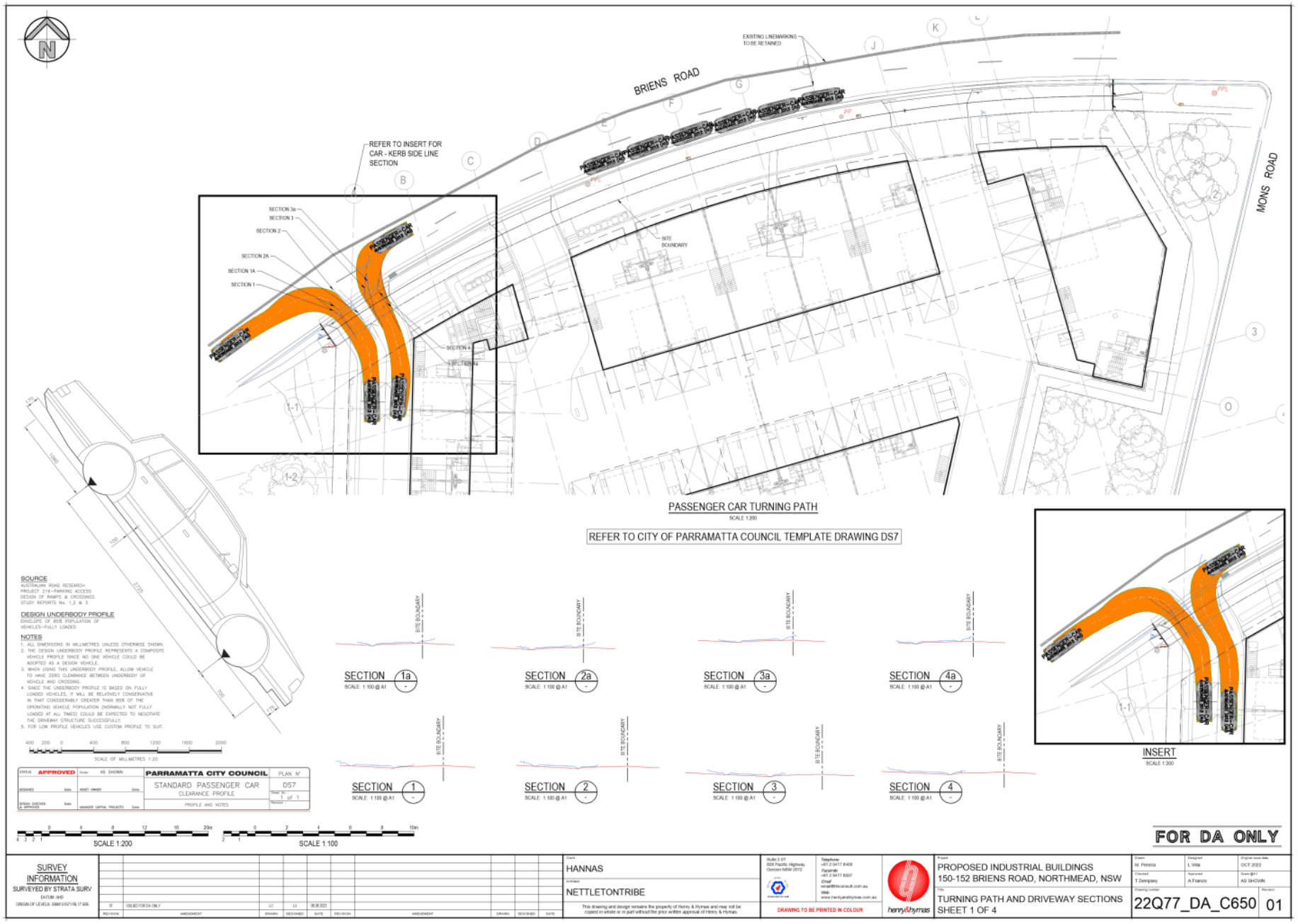
henry&hymas

PROJECT: PROPOSED INDUSTRIAL BUILDINGS
150-152 BRIENS ROAD, NORTHMEAD, NSW

TITLE: PUBLIC DOMAIN WORKS
LINEMARKING AND SIGNPOSTING PLAN

Drawn	Designed	Original Issue date
M. Pereira	L. Villa	OCT 2022
Checked	Approved	Scale @A1
T. Dempsey	A. Francis	1:200

Drawing number: 22Q77_DA_C600
Revision: 01


BRIENS ROAD
MONS ROAD
EXISTING LINEMARKING TO BE RETAINED
REFER TO INSERT FOR CAR - KERB SIDE LINE SECTION
SITE BOUNDARY
PASSENGER CAR TURNING PATH
SCALE 1:200
REFER TO CITY OF PARRAMATTA COUNCIL TEMPLATE DRAWING DS7
INSERT
SCALE 1:200
SECTION 1a
SECTION 2a
SECTION 3a
SECTION 4a
SECTION 1
SECTION 2
SECTION 3
SECTION 4
SOURCE
DESIGN UNDERBODY PROFILE
NOTES
PARRAMATTA CITY COUNCIL
STANDARD PASSENGER CAR
CLEARANCE PROFILE
DS7
APPROVED
SCALE 1:200
SCALE 1:100
FOR DA ONLY
SURVEY INFORMATION
SURVEYED BY STRATA SURV
HANNAS
NETTLETONTRIBE
PROPOSED INDUSTRIAL BUILDINGS
150-152 BRIENS ROAD, NORTHMEAD, NSW
TURNING PATH AND DRIVEWAY SECTIONS
SHEET 1 OF 4
22Q77_DA_C650
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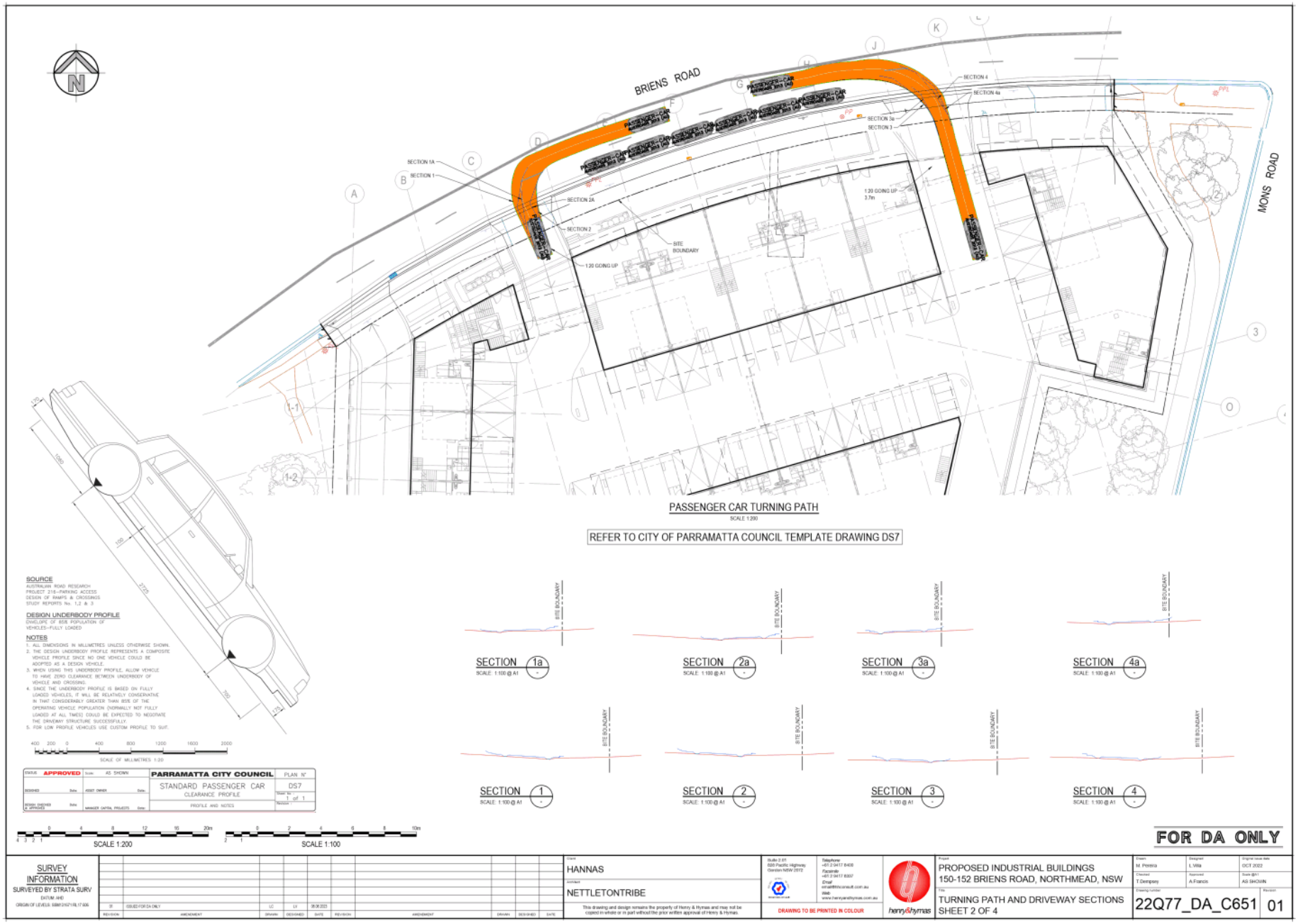
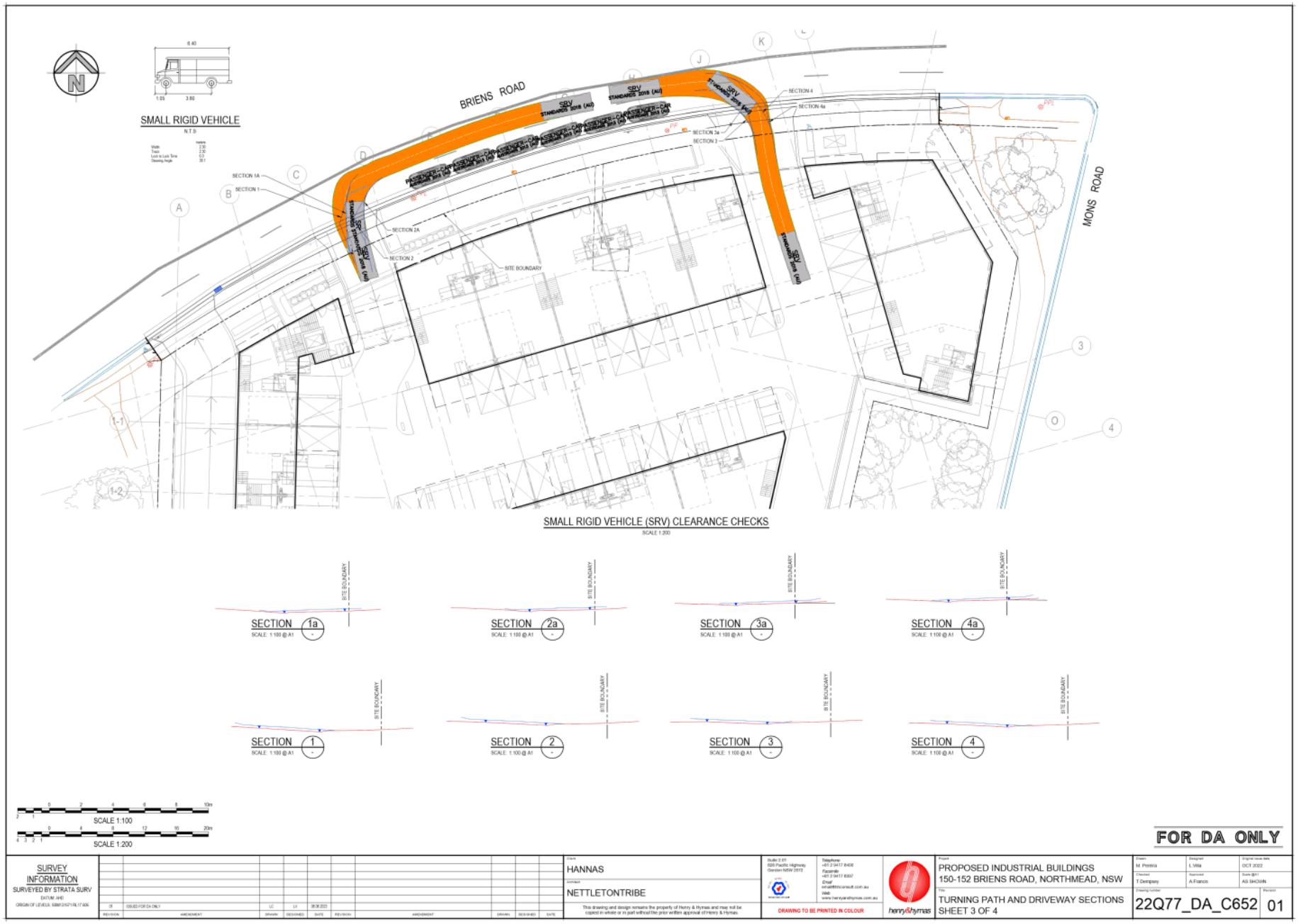

BRIENS ROAD
MONS ROAD
SECTION 1A
SECTION 1
SECTION 2A
SECTION 2
SECTION 3a
SECTION 3
SECTION 4
SECTION 4a
1:20 GOING UP
3.7m
SITE BOUNDARY
PASSENGER CAR TURNING PATH
SCALE 1:200
REFER TO CITY OF PARRAMATTA COUNCIL TEMPLATE DRAWING DS7
SOURCE
AUSTRALIAN ROAD RESEARCH
PROJECT 218—PARKING ACCESS
DESIGN OF RAMPS & CROSSINGS
STUDY REPORTS No. 1,2 & 3
DESIGN UNDERBODY PROFILE
ENVELOPE OF 85% POPULATION OF
VEHICLES—FULLY LOADED
NOTES
1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE SHOWN.
2. THE DESIGN UNDERBODY PROFILE REPRESENTS A COMPOSITE VEHICLE PROFILE SINCE NO ONE VEHICLE COULD BE ADOPTED AS A DESIGN VEHICLE.
3. WHEN USING THIS UNDERBODY PROFILE, ALLOW VEHICLE TO HAVE ZERO CLEARANCE BETWEEN UNDERBODY OF VEHICLE AND CROSSING.
4. SINCE THE UNDERBODY PROFILE IS BASED ON FULLY LOADED VEHICLES, IT WILL BE RELATIVELY CONSERVATIVE IN THAT CONSIDERABLY GREATER THAN 85% OF THE OPERATING VEHICLE POPULATION (NORMALLY NOT FULLY LOADED AT ALL TIMES) COULD BE EXPECTED TO NEGOTIATE THE DRIVEWAY STRUCTURE SUCCESSFULLY.
5. FOR LOW PROFILE VEHICLES USE CUSTOM PROFILE TO SUIT.
SCALE OF MILLIMETRES 1:20
SECTION 1a
SECTION 2a
SECTION 3a
SECTION 4a
SECTION 1
SECTION 2
SECTION 3
SECTION 4
SCALE 1:100 @ A1
APPROVED
PARRAMATTA CITY COUNCIL
STANDARD PASSENGER CAR
CLEARANCE PROFILE
PROFILE AND NOTES
DS7
1 of 1
SCALE 1:200
SCALE 1:100
FOR DA ONLY
SURVEY INFORMATION
SURVEYED BY STRATA SURV
ISSUED FOR DA ONLY
HANNAS
NETTLETONTRIBE
DRAWING TO BE PRINTED IN COLOUR
henry&hymas
PROPOSED INDUSTRIAL BUILDINGS
150-152 BRIENS ROAD, NORTHMEAD, NSW
TURNING PATH AND DRIVEWAY SECTIONS
SHEET 2 OF 4
22Q77_DA_C651
01


SMALL RIGID VEHICLE
N.T.S
BRIENS ROAD
MONS ROAD
SITE BOUNDARY
SECTION 1A
SECTION 1
SECTION 2A
SECTION 2
SECTION 3a
SECTION 3
SECTION 4
SECTION 4a
SMALL RIGID VEHICLE (SRV) CLEARANCE CHECKS
SCALE 1:200
SECTION 1a
SECTION 2a
SECTION 3a
SECTION 4a
SECTION 1
SECTION 2
SECTION 3
SECTION 4
SCALE 1:100
SCALE 1:200
FOR DA ONLY
SURVEY INFORMATION
SURVEYED BY STRATA SURV
HANNAS
NETTLETONTRIBE
PROPOSED INDUSTRIAL BUILDINGS
150-152 BRIENS ROAD, NORTHMEAD, NSW
TURNING PATH AND DRIVEWAY SECTIONS
SHEET 3 OF 4
22Q77_DA_C652
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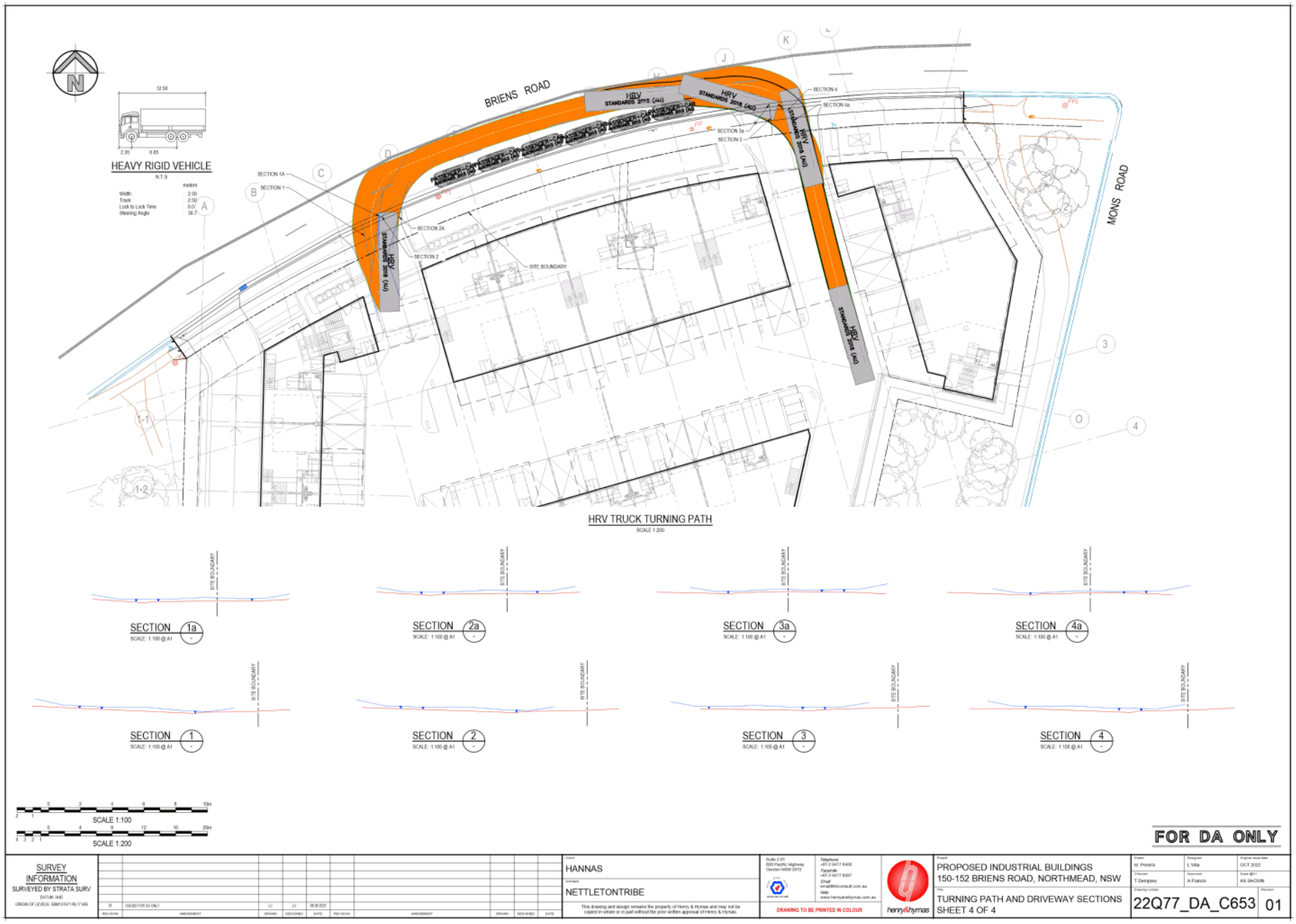
OCT 2022
AS SHOWN
DRAWING TO BE PRINTED IN COLOUR


BRIENS ROAD
MOMS ROAD
HRV STANDARDS 2018 (AU)
SITE BOUNDARY
HEAVY RIGID VEHICLE
N.T.S
HRV TRUCK TURNING PATH
SCALE 1:200
SECTION 1a
SECTION 2a
SECTION 3a
SECTION 4a
SECTION 1
SECTION 2
SECTION 3
SECTION 4
SCALE 1:100
SCALE 1:200
FOR DA ONLY
SURVEY INFORMATION
SURVEYED BY STRATA SURV
HANNAS
NETTLETONTRIBE
PROPOSED INDUSTRIAL BUILDINGS
150-152 BRIENS ROAD, NORTHMEAD, NSW
TURNING PATH AND DRIVEWAY SECTIONS
SHEET 4 OF 4
22Q77_DA_C653
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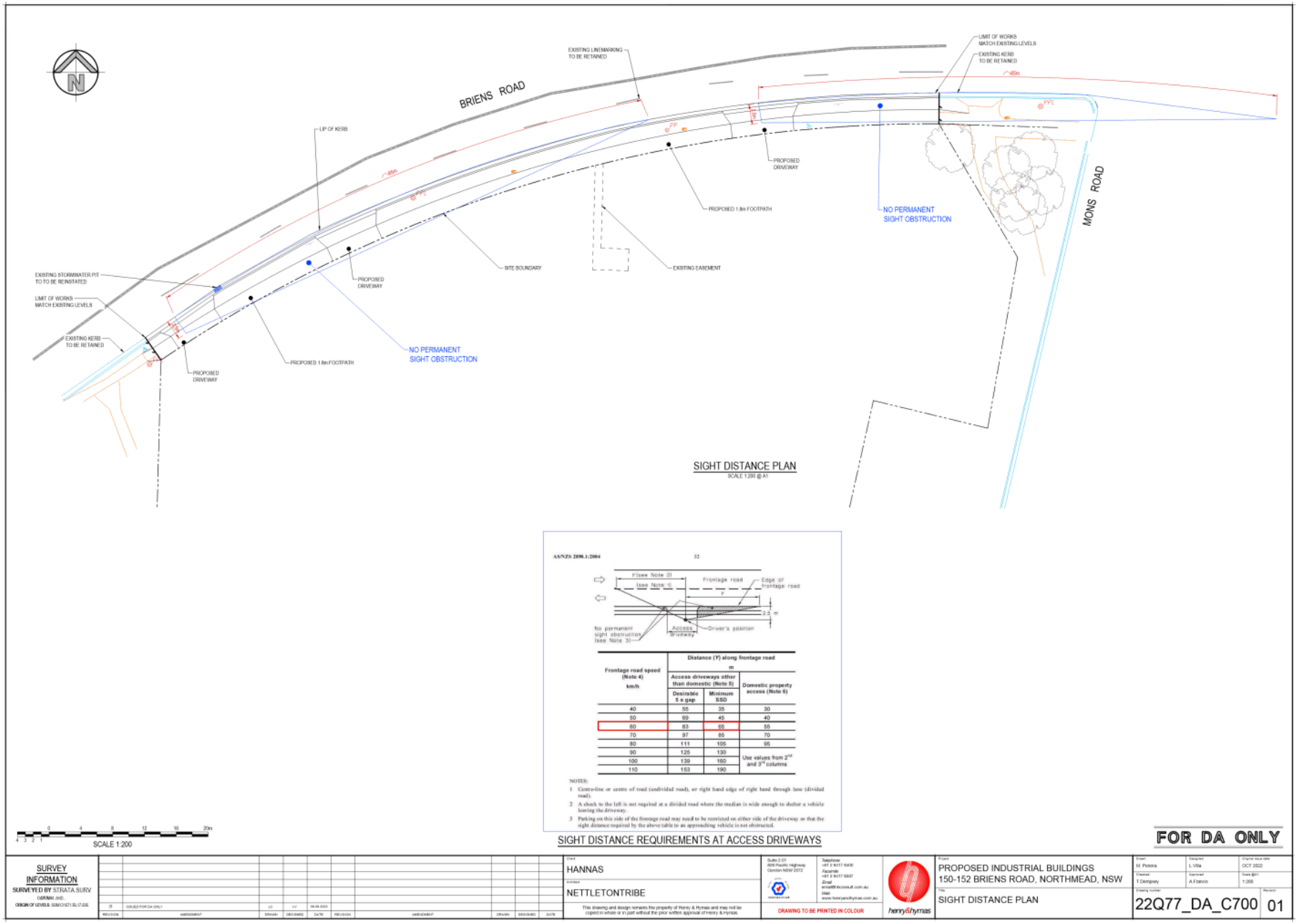


Frontage road speed (Note 4) km/h	Distance (Y) along frontage road m		
	Access driveways other than domestic (Note 5)		Domestic property access (Note 6)
	Desirable 5 s gap	Minimum SSD	
40	55	35	30
50	69	45	40
60	83	65	55
70	97	85	70
80	111	105	95
90	125	130	Use values from 2nd and 3rd columns
100	139	160	
110	153	190	

NOTES:

1 Centre-line or centre of road (undivided road), or right hand edge of right hand through lane (divided road).

2 A check to the left is not required at a divided road where the median is wide enough to shelter a vehicle leaving the driveway.

3 Parking on this side of the frontage road may need to be restricted on either side of the driveway so that the sight distance required by the above table to an approaching vehicle is not obstructed.

DEVELOPMENT APPLICATION

ITEM NUMBER	5.2
SUBJECT	PUBLIC MEETING: 10/11 Blaxland Avenue, NEWINGTON NSW 2127 (Lot 40 SP 58861)
DESCRIPTION	Change of use of an existing room within the dwelling for a home business
REFERENCE	DA/731/2023 - D09427883
APPLICANT/S	Kah Seng Leong
OWNERS	Kah Seng Leong
REPORT OF	Group Manager Development and Traffic Services
RECOMMENDED	Approval

DATE OF REPORT 15 APRIL 2024

REASON FOR REFERRAL TO LPP

This development application is being referred to Parramatta Local Planning Panel as the application received more than 10 unique objections.

EXECUTIVE SUMMARY

The Development Application, DA/731/2023 was lodged to Council on 7 December 2023 for the change of use of an existing room within the dwelling for a home business at 10/11 Blaxland Avenue, Newington.

The site is zoned R4 High Density Residential and surrounding properties are zoned R3 Medium Density Residential and R4 High Density Residential. The site is not impacted by flooding, heritage or bushfire.

In accordance with the Parramatta Consolidated Notification Procedures, the Development Application was notified from the 18 December 2023 and 17 January 2023. In response twelve (12) submissions were received generally raising the following concerns: hours of operation, impacts onto public safety and common public area and odour impacts, grease and oil buildup, maintenance requirements, scale of business and consumption of water and electricity.

In accordance with the *Environmental Planning and Assessment Act 1979*, Section 9.1 – Directions by the Minister, this application is reported to the Parramatta Local Planning Panel for determination as the development received 10 or more unique submissions by way of objection.

The Council's Environmental Health Officer reviewed the application and raised no objections subject to appropriate conditions of consent.

The Council's Traffic Engineer reviewed the application and raised no objections.

RECOMMENDATION

(a) That the Parramatta Local Planning Panel exercising the functions of Council as the consent authority, grant development consent to DA/731/2023 on land at 10/11 Blaxland Road Newington, for a period of five (5) years within which

physical commencement is to occur from the date on the Notice of Determination, subject to conditions of consent in **Attachment 1.**

(b) That the submitters are advised of the decision.

REASONS FOR APPROVAL

1. The development is permissible in the R4 High Density zone pursuant to Parramatta Local Environmental Plan 2023 and satisfies the requirements of the applicable planning framework.

2. The development will be compatible with the emerging and planned future character of the area.

3. The development will promote land use that provides a facility to meet the day-to-day needs of Parramatta Council occupants.

4. The proposal provides non-residential land use where any amenity impacts that can be appropriately managed.

5. The development is in the public interest because it is consistent with the objectives of development in the R4 High Density zone.

6. For the reasons given above, approval of the application is in the public interest.

Mathuran Stephens
Development Assessment Officer

ATTACHMENTS:

1	Assessment report and draft conditions	20 Pages
2	Locality Map	1 Page
3	Plan used during assessment	2 Pages
4	Internal plans used during assessment (confidential)	2 Pages

REFERENCE MATERIAL

City of Parramatta	
File No:	DA/731/2023

SECTION 4.15 ASSESSMENT REPORT
Environmental Planning & Assessment Act 1979

DA No:	DA/731/2023
Subject Property:	Lot 40 SP 58861, 10/11 Blaxland Avenue, NEWINGTON NSW 2127
Proposal:	Change of use of an existing room within the dwelling for a home business.
Date of receipt:	7 December 2023
Applicant:	Design and Approval Group
Owner:	K S Leong and G Szathmari
Property owned by a Council employee or Councillor:	The site is not known to be owned by a Council employee or Councillor
Political donations/gifts disclosed:	None disclosed on the application form
Submissions received:	Twelve (12) Submissions
Recommendation:	**Approval**
Assessment Officer:	Mathuran Stephen

Legislative Requirements

Relevant provisions considered under section 4.15(1)(a) of the Environmental Planning and Assessment Act 1979	• State Environmental Planning Policy (Biodiversity and Conservation) 2021 • State Environmental Planning Policy (Resilience and Hazards) 2021 • State Environmental Planning Policy (Transport and Infrastructure) 2021 • State Environmental Planning Policy (Sustainable Buildings) 2022 • Parramatta Local Environmental Plan 2023 (PLEP 2023) • Parramatta Development Control Plan 2023 (PDCP 2023)
Zoning	R4 – High Density Residential
Bushfire Prone Land	No
Heritage	No
Heritage Conservation Area	No
Designated Development	No
Integrated Development	No
Clause 4.6 variation	No
Delegation	**Parramatta Local Planning Panel (PLPP)** due to receiving more than ten (10) objections.

1. Executive Summary

Development Application DA/731/2023 was lodged on 7 December 2023 for 'Change of use of an existing room within the dwelling for a home business.'

In accordance with the Parramatta Consolidated Notification Procedures, the Development Application was notified and advertised between 18 December 2023 and 17 January 2024. In response, twelve (12) submissions were received.

The concerns raised in the submissions have been summarised and addressed later in the report.

In accordance with the Environmental Planning and Assessment Act 1979, Section 9.1 – Directions by the Minister, this application is reported to the Parramatta Local Planning Panel for determination as the proposed development received over ten (10) submissions.

Section 4.15 Assessment Summary

The application has been assessed relative to section 4.15 of the Environmental Planning and Assessment Act 1979, taking into consideration all relevant state and local planning controls.

The proposed use of the subject site as a home business is permitted within the R4 High Density Residential zone with consent pursuant to the provisions of Parramatta Local Environmental Plan 2023.

The application was referred to a number of internal stakeholders, including the following:

- Environmental Health Officer (food).
- Environmental Health Officer (waste).
- Traffic

All referrals were returned with no objections raised, subject to the imposition of conditions of consent.

The proposal is for a change of use of an existing room within a dwelling for the purpose of a home business to bake cakes. No physical works are proposed, and the home business is not considered to have any other impacts to the surrounding amenity of the locality. The proposed development is appropriately located and is compliant with the provisions of Parramatta LEP 2023 and Parramatta DCP 2023.

The home business would operate utilising the existing facilities and appliances which were to be expected within a typical residential dwelling. The business would have a maximum of two (2) employees. The proposed hours of operation are 9:00 am to 8:00 pm, seven days a week. Despite the lengthy hours of operation, given that the home business will operate with the existing appliances, no impacts beyond what is to be expected within the residential zone is anticipated. Cakes will be picked up by customers on the street between 10-11 am, 2-3 pm and 5-6 pm daily with each interaction taking approximately 5 minutes at a volume of 15 customers per week. Two (2) visitor parking spaces are available in the basement carpark alongside on-street parking for customers.

Having regard to the matters for consideration under Section 4.15 of the Environmental Planning and Assessment Act, it is recommended Development Application No. DA/731/2023 be approved. The recommended conditions of consent are within **Attachment 1**.

The subject site is known as 10/11 Blaxland Avenue, Newington. The site and surrounding properties are zoned R4 High Density Residential. The site currently accommodates a 3 (three) storey building used as residential accommodation and basement car parking.

2. Site Description and Conditions

The subject site is legally described as Lot 40 SP 58861 and commonly known as 10/11 Blaxland Avenue, Newington and has an approximate area of 7487.84m^2.

The site currently accommodates a 3 (three) storey residential flat building and basement car parking. The site has a street frontage of approximately 38.68m to George Street and 138.32m to Smith Street.

It is located within an existing residential area comprising of medium to high density residential developments.

To clarify the location of the application site and specifically that of the subject site, refer to the aerial image and photographs in **Figures 1 -** below.

Figure 1: Aerial view of the subject site and surrounds. Subject site outlined in blue. Source: Nearmap: October 2023

Figure 2: Subject site as viewed from Blaxland Road. Source: Site Inspection.

Page 3 of 15

Figure 3: Properties to the south as viewed from Blaxland Road. Source: Site Inspection.

Figure 4: Properties opposite from the site as viewed from Blaxland Road. Source: Site Inspection.

Figure 5: Properties to the north as viewed from Blaxland Road. Source: Site Inspection.

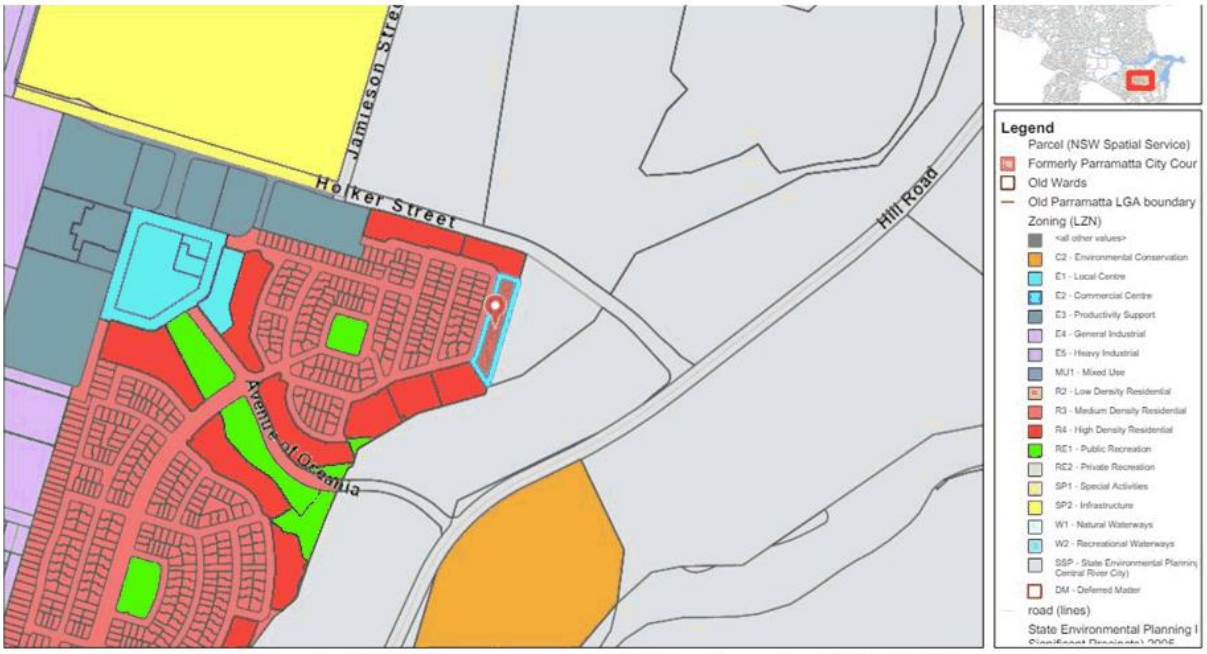


Figure 5: R4 High Density Residential Zoning Map extract (PLEP 2023).

3. The Proposal

The proposal seeks consent for the change of use of an existing room within the dwelling for a home business. Further information of the proposal is as follows:

- No physical works are proposed.
- The business would have a maximum of two (2) employees.
- The proposed hours of operation are 9:00 am to 8:00 pm, seven days a week.
- Cakes will be picked up by customers on the street between 10-11 am, 2-3 pm and 5-6 pm daily with each interaction taking approximately 5 minutes at a volume of 15 customers per week.
- No signage is proposed.

4. Referrals

The following section outlines the response and conditions recommended from each of the internal referrals in relation to the subject application.

Referral	Comment
Environmental Health - Food	Supported, subject to conditions of consent. Council's Environmental Health Officer reviewed the application and raised no objections subject to appropriate conditions of consent.
Environmental Health - General	Supported, subject to conditions of consent. Council's Environmental Health Officer reviewed the application and raised no objections subject to appropriate conditions of consent.
Traffic	Supported. Council's Traffic Engineer reviewed the application and raised no objections.

5. Environmental Planning Instruments

STATE ENVIRONMENTAL PLANNING POLICY (RESILIENCE AND HAZARDS) 2021 – CHAPTER 4: REMEDIATION OF LAND

The site is identified in Council's records as being remediated during Sydney Olympics in 2000 as previous land uses resulted in soil contamination. The site has been used for residential purposes since the Olympics.

The development seeks the use of a space within an existing dwelling within an existing residential flat building. No disturbance of soil is required or expected.

Accordingly, the development application is satisfactory having regard to the relevant matters for consideration under SEPP (Resilience and Hazards) 2021.

STATE ENVIRONMENTAL PLANNING POLICY BUILDING SUSTAINABILITY) 2022

A BASIX Certificate was not required to be submitted with the application as no physical works are proposed.

STATE ENVIRONMENTAL PLANNING POLICY (TRANSPORT AND INFRASTRUCTURE) 2021 – CHAPTER 2: INFRASTRUCTURE

The provisions of State Environmental Planning Policy (Transport and Infrastructure) 2021 have been considered in the assessment of the development application.

Clause	Comment
Clause 2.48 – electricity infrastructure	**N/A**
Clause 2.119 – frontage to a classified road	**This clause is not triggered. Blaxland Avenue is not a classified road.**
Clause 2.122 – average daily traffic volume of more than 20,000 vehicles.	**Blaxland Avenue has less than 20,000 vehicles per day**

Appropriate conditions are recommended to address the requirements of the SEPP.

STATE ENVIRONMENTAL PLANNING POLICY (BIODIVERSITY AND CONSERVATION) 2021

CHAPTER 2: VEGETATION IN NON-RURAL AREAS

The application has been assessed against the requirements of State Environmental Planning Policy (Biodiversity and Conservation) 2021. This Policy seeks to protect the biodiversity values of trees and other vegetation in non-rural areas of the State, and to preserve the amenity of non-rural areas of the State through the preservation of trees and other vegetation.

N/A – no trees are proposed to be removed.

CHAPTER 6: WATER CATCHMENTS

The proposal is not located on land in a regulated catchment and is not flood affected and therefore is not subject to the controls within Division 2 Controls on Development Generally. The proposal is also not located in any of the specific areas stipulated in Division 3 Controls on Development in Specific Areas within Part 6.2 Development in Regulated Catchments. The proposed use of the site as a home business does not trigger any requirements under Division 4 Controls on Development for Specific Purposes. The proposal is not located in the Foreshores and Waterways Area and does not trigger any requirements under Part 6.3 Foreshores and Waterways Area. The proposal is not located in the Sydney Harbour catchment and is not identified as a heritage item and therefore does not trigger the requirements of Part 6.4 Heritage Conservation in Sydney Harbour. The proposal is not located in the Sydney Drinking Water Catchment and does not trigger the requirements of Part 6.5 Sydney Drinking Water Catchment.

6. PARRAMATTA LOCAL ENVIRONMENTAL PLAN 2023

The relevant matters considered under the PLEP 2023 for the proposed development are outlined below:

Clause 1.2 Aims of Plan

(2) The particular aims of this Plan are as follows—
(aa) to protect and promote the use and development of land for arts and cultural activity, including music and other performance arts,
(a) to protect and enhance the identity, diversity and viability of Parramatta City Centre and recognise its role in the Central River City of the Six Cities Region,
(b) to create an integrated, balanced and sustainable environment that contributes to environmental, economic, social and physical wellbeing,
(c) to identify, conserve and promote the City of Parramatta's natural and cultural heritage,
(d) to protect and enhance the natural environment, including urban tree canopy cover and areas of remnant bushland,
(e) to ensure development occurs in a way that protects, conserves and enhances natural resources, including waterways, riparian land, surface and groundwater quality and flows and dependent ecosystems,
(f) to encourage ecologically sustainable development,
(g) to minimise risk to the community in areas subject to environmental hazards, particularly flooding and bushfire, by restricting development in sensitive areas,
(h) to improve public access along waterways if the access does not adversely impact the natural value of the waterways,
(i) to improve public access to, and within, the City of Parramatta and facilitate the use of public transport, walking and cycling,
(j) to encourage a range of development to meet the needs of existing and future residents, workers and visitors,
(k) to enhance the amenity and characteristics of established residential areas,
(l) to retain the predominant role of industrial areas,
(m) to ensure development does not detract from the economic viability of commercial centres,
(n) to ensure development does not detract from the operation of local or regional road systems.

It is considered that the development satisfactorily meets the aims of the plan.

Permissibility

The site is zoned R4 High Density Residential under the Parramatta LEP 2023. The proposal is defined as a home business.

home business *means a business, whether or not involving the sale of items online, carried on in a dwelling, or in a building ancillary to a dwelling, by 1 or more permanent residents of the dwelling and not involving the following—*
(a) the employment of more than 2 persons other than the residents,

Two (2) residents would be involved in the operation of the home business.

(b) interference with the amenity of the neighbourhood because of the emission of noise, vibration, smell, fumes, smoke, vapour, steam, soot, ash, dust, wastewater, waste products, grit or oil, traffic generation or otherwise,

The application is for a home business to bake cakes which are to be picked up by customers. Council's Environmental Health Officer has assessed the noise, odour, acoustic and waste impacts of the proposal and considered it satisfactory subject to conditions. Customers pick up will be restricted to between 10-11 am, 2-3pm and 5-6pm with each pickup taking approximately 5 minutes. Given the two (2) available visitor parking spaces within the building alongside the on-street parking, impacts onto traffic are considered to be minimal.

(c) the exposure to view, from adjacent premises or from a public place, of unsightly matter,

The proposal does not require any physical works and would have no impacts on views from adjacent premises and public places.

(d) the exhibition of signage, other than a business identification sign,

No signs are proposed.

(e) the retail sale of, or the exposure or offer for retail sale of, items, whether goods or materials, not produced at the dwelling or building, other than by online retailing,
but does not include bed and breakfast accommodation, home occupation (sex services) or sex services premises.

The proposal is for a home business for the sale of cakes produced only within the premises.

The proposed development and associated works are permissible with consent.

Zone Objectives

The site is zoned R4 High Density Residential under the Parramatta Local Environmental Plan 2023.

The aims and objectives for the R4 zone in Clause 2.3 – Zone Objectives are as follows:

- *To provide for the housing needs of the community within a high-density residential environment.*
- *To provide a variety of housing types within a high-density residential environment.*
- *To enable other land uses that provide facilities or services to meet the day to day needs of residents.*
- *To provide for high density residential development close to open space, major transport nodes, services and employment opportunities.*
- *To provide opportunities for people to carry out a reasonable range of activities from their homes if the activities will not adversely affect the amenity of the neighbourhood.*

The application proposes the change of use of an existing room within a dwelling for the purpose of a home business to bake cakes. The change of use will provide an opportunity for people to carry out a reasonable activity from their home which would not adversely affect the amenity of the neighbourhood.

Standards and Provisions	Comment	Compliance
Part 4 Principal development standards		
Cl. 4.1 Minimum Lot Size	The site is not subject to a minimum lot size.	N/A.
Cl. 4.3 Height of buildings	The proposal is for the use of an existing kitchen within a unit for the purpose of a home business and no physical works are	Yes.

	proposed. Therefore, the height of buildings would remain unchanged.	
Cl. 4.4 Floor space ratio	The proposal is for the use of an existing kitchen within a unit for the purpose of a home business and no physical works are proposed. Therefore, the floor space ratio would remain unchanged.	Yes.
Cl. 4.6 Exceptions to Development Standards	No variation to a development standard is sought.	N/A
Part 5 Miscellaneous provisions		
Cl. 5.1A Development on land intended to be acquired for public purposes	The proposal is not identified on the map.	N/A.
Cl. 5.4 Controls Relating to miscellaneous permissible uses. If development for the purposes of a home business is permitted under this Plan, the carrying on of the business must not involve the use of more than 50 square metres of floor area.	The proposed home business would operate wholly within the existing kitchen which has a floor area of 8.4m^2.	Yes.
Cl. 5.6 Architectural roof features	An architectural roof feature is not proposed.	N/A.
Cl. 5.7 Development below mean high water mark	The proposal is not for the development of land that is covered by tidal waters.	N/A.
Cl. 5.10 Heritage conservation	The subject site does not contain a heritage item, however, is adjacent eastward to land which is zoned Conservation Area – General and State Heritage Register Curtilage. Given that no physical works are proposed, no impacts onto this land would occur and a referral to Council's Heritage Advisor was not considered necessary.	Yes.
Cl. 5.10(8) Aboriginal places of heritage significance	The subject site is located within a low sensitivity recorded area.	N/A
Cl. 5.11 Bush fire hazard reduction	The site is not identified as bushfire prone.	N/A.
Cl. 5.21 Flood Planning	The site is not identified as being flood prone.	Yes.
Part 6 Additional local provisions		
Cl. 6.1Acid sulphate soils	The site is identified as containing Class 5 Acid Sulphate Soil. An Acid Sulphate Soils Management Plan is not required to be prepared.	Yes.
Cl. 6.2 Earthworks	The application is for the use of an existing kitchen within a unit for the purpose of a home business and no earthworks are proposed.	N/A.
Cl. 6.4 Biodiversity protection	The site is not identified on this map.	N/A.
Cl. 6.5 Stormwater Management	The application is for the use of an existing kitchen within a unit for the purpose of a home business and no changes to stormwater management would occur.	Yes.
Cl. 6.6 Foreshore Area	The site is not located in the foreshore area.	Yes.
Cl. 6.8 Landslide risk	The site is identified on this map.	N/A.

7. PARRAMATTA DEVELOPMENT CONTROL PLAN 2023

The relevant matters to be considered under Parramatta Development Control Plan 2023 for the proposed development are outlined below.

Standards and Provisions	Comment	Compliance
Part 2 Design Context		
2.3 Preliminary Building Envelope C.01 – C.07	The proposal is for the use of an existing kitchen within a unit for the purpose of a home business and no physical works are proposed. Therefore, no changes to the building envelope would occur.	Yes
2.4 Building Form and Masses C.01 – C.07	The proposal is for the use of an existing kitchen within a unit for the purpose of a home business and no physical works are proposed. Therefore, no changes to the building envelope would occur.	Yes
2.5 Streetscape and Building Address C.01 – C.12	The proposal is for the use of an existing kitchen within a unit for the purpose of a home business and no physical works are proposed. Therefore, no changes to the streetscape and appearance of the building would occur.	Yes Yes
2.6 Fences C.01 – C.11	No fence is proposed.	N/A
2.7 Open Space and Landscape C.01 – C.16	The proposal is for the use of an existing kitchen within a unit for the purpose of a home business and no physical works are proposed. Therefore, no changes to open space and landscaping would occur.	Yes
2.8 Views and Vistas C.01 – C.06	There are no significant views or vistas affected from the proposal.	Yes
2.9 Public Domain C.01 – C.10	There is no significant impact on public domain.	Yes
2.10 Accessibility and Connectivity C.01 – C.10	There is no significant impact on accessibility and connectivity.	Yes
2.11 Access for People with a Disability C.01	The Disability Discrimination Act 1992 is not triggered on this development.	N/A
2.12 Amenities in Buildings Available to The Public C.01	The proposal does not affect amenities to the public.	Yes
2.13 Culture and Public Art C.01 – C.03	The proposal does not impact culture and public art.	Yes
2.14 Safety and Security C.01 – C.12	There is no negative impact on safety and security for adjoining properties.	Yes
2.15 Signage C.01 – C.33	There is no signage proposed.	N/A

Part 3 Residential Development		
3.2 General Residential Controls		
3.2.1 Solar Access and Cross Ventilation C.01 – C.16	The application is for the use of a dwelling as a home business and no physical works are proposed, therefore the solar access would remain unchanged.	Yes
3.2.2 Visual and Acoustic Privacy C.01 – C.09	The application is for the use of a dwelling as a home business and no physical works are proposed, therefore visual privacy would remain unchanged. Council's Environmental Health Officer reviewed the application and considered the acoustic impacts of the proposed home business satisfactory subject to conditions. Furthermore, the proposed home business does not propose any physical works and its operation would utilise the existing appliances and facilities. Given this, the proposed home business is not considered to produce noise greater than what is typically expected of residential use.	Yes
3.2.3 Attic Design C.01 – C.11	There is no attic proposed.	N/A
3.2.4 Swimming Pools C.01 – C.06	No swimming pool is proposed.	N/A.
3.2.5 Outbuildings C.01 – C.07	There are no outbuildings proposed in the development.	N/A
3.5 Apartment Buildings		
3.5.1 Key Development Standards for Apartment Buildings		
3.5.1.1 Minimum Site Frontage C.01 - C.03	The application is for the use of an existing kitchen within a unit as a home business and no physical works are proposed, therefore the site frontage would remain unchanged.	Yes
3.5.2.2 Preliminary Building Envelope C.01 - C.10	The application is for the use of an existing kitchen within a unit as a home business and no physical works are proposed, therefore the building height, setbacks and side and rear setbacks would remain unchanged.	Yes
3.5.2.3 Streetscape and Building Address C.01 - C.10	The application is for the use of an existing kitchen within a unit as a home business and no physical works are proposed, therefore there would be no changes to how the existing development addresses the streetscape and its appearance.	Yes
3.5.2.4 Open Space and Landscape C.01 - C.02	The application is for the use of an existing kitchen within a unit as a home business and no physical works are proposed, therefore the open space and landscape area would remain unchanged.	Yes
3.5.2.5 Parking Design and Vehicular Access C.01 - C.09	The application is for the use of an existing kitchen within a unit as a home business and no physical works are proposed, therefore the existing parking design and vehicular access would remain unchanged.	Yes
3.5.2.6 Internal Amenity C.01 - C.07	The application is for the use of an existing kitchen within a unit as a home business and no physical works are proposed, therefore the existing internal amenity would remain unchanged.	Yes

10. Development Contributions

The City of Parramatta (Outside CBD) Development Contributions Plan 2021 commenced on 20 September 2021. It was prepared by the City of Parramatta Council under section 7.11 of the Environmental Planning and Assessment Act 1979. As the proposal is for a home business, a Section 7.11 Development Contribution is not required to be paid.

11. Bonds

The proposed change of use of a room within an existing dwelling to a home business is not a Class 1 or Class 10 building and does not achieve the works value threshold to be subject to Security Bonds. Given this, in accordance with Council's Schedule of Fees and Charges, Security Bonds are not applicable to the proposal.

12. EP&A Regulation 2021

Applicable Regulation considerations including demolition, fire safety, fire upgrades, compliance with the Building Code of Australia, compliance with the Home Building Act, PCA appointment, notice of commencement of works, sign on work sites, critical stage inspections and records of inspection have been addressed by appropriate consent conditions, refer to Appendix 1.

13. The likely impacts of the development

The assessment demonstrates that the proposal will not have any significant adverse impacts upon any adjoining properties or the environment through compliance with the applicable planning instruments and controls. All relevant issues regarding environmental impacts of the development are discussed elsewhere in this report, including management of noise, odour and waste, and built environment impacts such as traffic. In the context of the site and the assessments provided by Council's experts, the development is considered satisfactory in terms of environmental impacts.

14. Suitability of the Site

The subject site can accommodate a development of a home business of this scale without causing impacts to the amenity of adjoining properties beyond what is considered supportable. The proposal adequately addresses the controls stipulated in the definition of a home business and achieves the objectives of the zone. Therefore, subject to the conditions provided within the recommendation to this report, the site is considered to be suitable for the proposed development.

15. Public Consultation

The application was notified in accordance with Council's consolidated notification procedures. In response, twelve (12) submissions were received. The issues raised within the submission is addressed below. Issues have been grouped to avoid repetition.

Issue	Response
Hours Of Operation	Given that the home business is to bake cakes using the existing appliances and facilities, the proposed hours of operation proposed are not considered to create impacts greater than what is anticipated from a residential use of a kitchen. The timeframe for customer pick-up is further reduced to a total of twenty-one (21) hours a week. A condition has been imposed ensuring that products sold from the home business are to be picked outside of the premises on the street, requiring the owner to exit the building to reduce the impacts of customer pick-ups and the hours of operation. Given this, the hours of operation are considered satisfactory and appropriate to the use.
Impacts Onto Public Safety, Security and Common Public Area	A condition has been imposed to require customer pick up of products to occur outside of the premises on the street and no customers are to enter the building to mitigate the impacts of the home business on public safety and the common public area.

Noise Impacts	Council's Environmental Health Officer assessed the application and considered the level of noise generated by the home business to be satisfactory subject to conditions.
Traffic Impacts	Customers will be utilising the two (2) visitor parking spaces within the building and the available on-sight car parking. Given that customer pick up would occur for twenty-one (21) hours a week at a length of approximately 5 minutes per pick up, the traffic impacts are considered negligible.
Frequent Transport of Materials and Products, Food Production and Throughput	Council's Traffic Engineer reviewed the application and considered it satisfactory and raised no objections. Given the minor scale of the home business, transport of materials and products is not expected to impact on the amenity of the surrounding residential area.
Cleaning And Maintenance Requirements	Customers pick up will occur outside of the premises on the street as per the conditions of consent with the agreement of the applicant. Given this, no customers would enter the premises beyond the carpark and the cleaning and maintenance of the building would remain unchanged. The home business would operate wholly within the unit and would not impact on any common property.
Pest Control	Council has imposed a condition of consent requiring any waste be removed from the site with sufficient frequency to avoid nuisance from pest and odour.
Odour Impacts	Council's Environmental Health Officer assessed the application and considered the management of odour generated by the home business to be satisfactory subject to conditions. Further conditions have also been implemented to ensure sufficient ventilation and exhaust systems are present.
Mandatory Compliance with Fire Safety, Australian Standards and Applicable Codes	A Fire Safety Statement was submitted with the application and adequately addressed the risk of fire and safety.
Storage of Large Quantities of Putrescible Products and Food Items and potential Offensive Odour and Attraction of Vermin's and Insects	A condition has been imposed by recommendation of Council's Environmental Health Officer which requires all putrescible waste to be removed from the site with sufficient frequency to avoid pests and odours.
Increased Water Consumption from the Strata Common Water Account.	This is building management matter to be addressed by the strata body.
Management of Wastewater	A condition of consent has been imposed to ensure the applicant complies with the requirements of Sydney Water regarding trade waste.
Electrical Installation Requirements Resulting from Increased Use of Cooking	The proposal is for the change of use of an existing room within a dwelling for the purpose of a home business and no physical works are proposed. The operation of the home business would utilise the existing appliances and facilities.
Change Of Existing Zoning Classifications	The proposal would not change the existing zoning classification. Furthermore, the proposal is permissible in the zone.
Higher Risk Profile Potentially Affecting Insurance Premium, Loss or Damage to Property	This is building management matter to be addressed by the strata body. Furthermore, this is not a matter for consideration under Section 4.15 of the Environmental Planning and Assessment Act 1979.
Higher Costs of Management, Maintenance, Repairs	This is building management matter to be addressed by the strata body. Furthermore, this is not a matter for consideration under Section 4.15 of the Environmental Planning and Assessment Act 1979.
Impact on the Property Value	This is not a matter for consideration under Section 4.15 of the Environmental Planning and Assessment Act 1979.
Negative Social Impact and Poor Public Acceptance	The proposal achieves the objective of the zone which seeks to allow opportunities for people to carry out a reasonable range of activities from their homes. The proposal seeks to provide food products to serve the community.

Legal Terms and Commercial Consequences	This is a building management issue to be addressed by the strata body governing the building.
Scale of the Home Business as Commercial	No physical works are proposed, and the home business would operate utilising the existing appliances and facilities that would be typically found in a residential dwelling. Furthermore, the proposed home business would only operate customer pick-ups for a total of twenty-one (21) hours a week which is considered acceptable for a home business. Furthermore, the proposal complies with the definition of a home business.
Grease and Oil Build Up	Council's Environmental Health Officer assessed the application and considered the management of grease and oil build up by the home business to be satisfactory subject to conditions. Further conditions have also been implemented to requiring the operation of the premises to comply with the relevant provisions of the Food Act 2003 and Food Safety Standards.
Increase to Building Insurance	This is building management matter to be addressed by the strata body.
Length of Notification Period	The length of the notification period was extended beyond the typical fourteen (14) to twenty-nine (29) days to account for the Christmas period.
Lack of Consent from Owners Corp SP58861	The Land and Environment Court has determined that the lot owner is "the owner" for the purpose of lodging a Development Application (Jeblon Pty Ltd v North Sydney Municipal Council [1982]). The application proposes no physical works and does not impact or alter any common property of the premises. Furthermore, no customers will enter the lot or the building. Given this, the owner of the site is considered to be the lot owner and consent of the strata body was not required to be provided.
Concern for Precedent Set for Similar Applications	The approval of this application is not considered to set an unexpected precedent given that home businesses are permissible within the R4 High Density Residential zone.
Damage/Overuse of Residential Common Property (Stairs, Carpets, Car Parks)	This is building management matter to be addressed by the strata body.
Residents' Unhappiness Leading to Community Distrust and Disharmony Making Newington an Unattractive Place to Buy Properties or to Live In	This is not a matter for consideration under Section 4.15 of the Environmental Planning and Assessment Act 1979.
The Business Commenced Trading Before the Application Was Made in Breach of Council's Process	This application seeks to provide consent for the use of an existing room within a dwelling for the purpose of a home business. The proposal was assessed and was considered satisfactory for approval given that it does not generate significant adverse impacts on its surroundings.
Aggravating the Existing Shortage of Parking in Blaxland Avenue and Traffic Concerns	Council's Traffic Officer reviewed the application and considered the traffic and parking impacts to be minimal.
Waste Management and Bins	Council's Environmental Health Officer has reviewed the application including a waste management plan and raised no issues subject to conditions of consent.
Lack of Consent from Newington Neighbourhood Association (P3)	The requirement for the applicant to seek owners' consent from Newington Neighbour Association does not fall within the scope of this application. Under the Environmental Planning and Assessment Act 1979, Council is satisfied that sufficient Owner's Consent has been provided.

16. Public interest

Subject to implementation of conditions of consent outlined in the recommendation below, no circumstances have been identified to indicate this proposal would be contrary to the public interest.

17. Conclusion

The application has been assessed relative to section 4.15 of the Environmental Planning and Assessment Act 1979, taking into consideration all relevant state and local planning controls.

The proposed development is appropriately located within the room of an existing dwelling within a residential development. Having regard to the assessment of the proposal from a merit perspective, Council officers are satisfied that the development sufficiently minimises adverse impacts on the amenity of neighbouring properties. Hence the development, is consistent with the intentions of the relevant planning controls and represents a form of development use contemplated by the relevant statutory and non-statutory controls applying to the land. On balance, the proposal has demonstrated a satisfactory response to the objectives and controls of the applicable planning framework.

For these reasons, it is considered that the proposal is satisfactory having regard to the matters of consideration under Section 4.15 of the Environmental Planning and Assessment Act, 1979 and is recommended for approval subject to conditions.

18. Recommendation

Pursuant to Section 4.16 of the Environmental Planning and Assessment Act, 1979:

A. **That** the Parramatta Local Planning Panel, exercising the function of the consent authority, **approve** development consent to DA/731/2023 for the 'change of use of an existing room within a dwelling for a home business' on land at 10/11 Blaxland Avenue, Ermington for the following reasons:

REASONS FOR APPROVAL

- The development is permissible in the R4 High Density zone pursuant to Parramatta Local Environmental Plan 2023 and satisfies the requirements of the applicable planning framework.
- The development will be compatible with the emerging and planned future character of the area.
- The development will promote a land use that provides a facility to meet the day to day needs of Parramatta Council occupants.
- The proposal provides a non-residential land use where any amenity impacts that can be appropriately managed.
- The development is in the public interest because it is consistent with the objectives of for development in the R4 High Density zone.
- For the reasons given above, approval of the application is in the public interest.

B. **That** Council advise those who made a submission of the determination.

"Appendix 1" to Section 4.15 Assessment Report - DA/731/2023

DRAFT CONDITIONS OF CONSENT

Upon the signature of the applicable delegate, the conditions in this Appendix will form the conditions of development consent.

Development Consent No.: **DA/731/2023**
Property Address: **Lot 40 SP 58861**
10/11 Blaxland Avenue, NEWINGTON
NSW 2127

PART A – GENERAL CONDITIONS

Approved Plans & Supporting Documents

1. Development must be carried out in accordance with the following approved plans and supporting documentation (stamped by Council), except where the conditions of this consent expressively require otherwise:

Architectural Drawings

Drawing/Plan No.	Issue	Plan Title	Dated
A102	A	Proposed Floor Plan	26/11/2023

Specialist Reports

Document	Ref No.	Issue	Prepared By	Dated
Statement of Environmental Effects	A23-135-231114-SEE	2	Design & Approval Group	14/11/2023
Fire Safety Statement	-	-	Anthony Vumbaca	11/02/2021

Note: In the event of any inconsistency between the approved plans and/or the civil drawings and/or landscape plans and/or supporting documentation, the approved plans prevail.

In the event of any inconsistency between the approved plans and a condition of consent, the condition prevails.

An inconsistency occurs between an approved plan and supporting documentation or between an approved plan and a condition when it is not possible to comply with both at the relevant time.

Reason: To ensure all parties are aware of the approved plans and supporting documentation that applies to the development

Exhaust from ventilation systems

2. Exhaust gases shall be discharged via a ventilation system installed in accordance with AS/NZS 1668.2:2012 - The Use of Mechanical Ventilation and Air-conditioning in Buildings.
   Reason: To ensure the correct installation and operation of equipment for the protection of the local environment.

Air Emissions - Use of Premises

3. The use of the premises must not give rise to the emission of gases, vapours, dusts or other impurities which are a nuisance, injurious or prejudicial to health. Gaseous emissions from the development must comply with the requirements of the Protection of the Environment Operations Act, 1997 and Regulations. Uses that produce airborne particulate matter must incorporate a dust collection system.
   Reason: To control offensive emissions and ensure the protection of the local environment.

PART B – PRIOR TO THE USE OF THE SITE

Design of fit-out to comply with food safety stand

4. Detailed plans of any food / beverage preparation facilities and waste storage areas shall be submitted to the principal certifying authority (PCA) prior to the use of the site.

   The fit-out of the food premises shall comply with:
   (a) Australian Standard AS4674-2004 - Design, Construction and Fit-out of Food Premises.
   (b) Food Safety Standards
   - Standard 3.2.2 Food Safety Practices and General Requirements
   - Standard 3.2.3 Food Premises and Equipment

   If a Private Certifier is to be used, the final inspection shall be carried out by a suitably qualified person to ensure that food standards are met. Council's Environmental Health Officer may be engaged to carry out the required inspection for a prescribed fee.
   Note: Copies of AS4764-2004 may be obtained from Standards Australia. Copies of the Food Standards Code may be obtained from Australia and New Zealand Food Authority.
   Alternatively, you may obtain a copy of the 'Food premises design, construction and fit-out guide' from Council. This guide is based on the

above standards and sets out minimum requirements to achieve compliance.
Reason: To ensure design of the premises meets relevant public health standards.

Notification of food business – Council

5. Prior to the use of the site, Council must be notified that the premises is to be used for the preparation of food for sale so that the premises can be registered on Council's food premises licensing database.
Reason: Compliance with the requirements of the Food Act.

Certify mechanical ventilation installation

6. Adequate ventilation to work areas and other occupied enclosures shall be provided in accordance with the requirements of the Building Code of Australia. Where any system of mechanical ventilation is installed, certification that the system functions in accordance with Australian Standard AS/NZS 1668.2.2012 is to be provided to the certifying authority prior to occupation of the premises.
Reason: To comply with the Building Code of Australia and the relevant Australian Standard.

PART C – USE OF THE SITE

Operating hours

7. The days and hours of operation are restricted to:

Day	Time
Monday	9:00AM to 8:00PM
Tuesday	9:00AM to 8:00PM
Wednesday	9:00AM to 8:00PM
Thursday	9:00AM to 8:00PM
Friday	9:00AM to 8:00PM
Saturday	9:00AM to 8:00PM
Sunday	9:00AM to 8:00PM

Customers pick up is restricted to:

Day	Time
Monday	10:00-11:00AM, 2:00-3:00PM and 5:00-6:00PM
Tuesday	10:00-11:00AM, 2:00-3:00PM and 5:00-6:00PM
Wednesday	10:00-11:00AM, 2:00-3:00PM and 5:00-6:00PM
Thursday	10:00-11:00AM, 2:00-3:00PM and 5:00-6:00PM
Friday	10:00-11:00AM, 2:00-3:00PM and 5:00-6:00PM
Saturday	10:00-11:00AM, 2:00-3:00PM and 5:00-6:00PM
Sunday	10:00-11:00AM, 2:00-3:00PM and 5:00-6:00PM

Reason: To minimise the impact on the amenity of the area.

Non-standard

8. Only goods or materials produced on site may be sold by retail.
Reason: To prevent loss of amenity to the area.

9. The picking up of goods or materials produced on site by customers must occur outside of the building premises on the street.
Reason: To prevent loss of amenity to the area.

10. The business must not occupy more than 50m2 of the dwelling house.
Reason: To protect the amenity of the area and legislative compliance.

11. The business must not employ more than 2 persons who do not ordinarily reside at the dwelling.
Reason: To protect the amenity of the area and legislative compliance.

EAF0001 Use is not to cause offensive noise or vibration

12. The use of the premises not giving rise to:
    (a) transmission of unacceptable vibration to any place of different occupancy,
    (b) a sound pressure level measured at any point on the boundary of any affected residential premises that exceeds the background noise level by more than 5 dB(A). The source noise level shall be assessed as an LAeq,15 min and adjusted in accordance with Environment Protection Authority (EPA) guidelines for tonality, frequency weighting, impulsive characteristics, fluctuations, and temporal content as described in the NSW Environmental Planning & Assessment Act 1979: Noise Policy for Industry 2017 and the Protection of the Environment Operations Act 1997.

    Reason: To prevent loss of amenity to the area.

EAF0007 Noise from mechanical equipment

13. The proposed use of the premises and the operation of all plant and equipment shall not give rise to an 'offensive noise' as defined in the Protection of the Environment Operations Act 1997.
Reason: To protect the amenity of the area.

EFF0001 Food premises

14. The operation of the premises is to comply with the relevant provisions of the Food Act 2003, Food Regulation 2015 and the Australia New Zealand Food Authority Food Standards Code.
Reason: To ensure operation of the premises complies with the relevant legislation and standards.

EFF0003 Remove putrescible waste at sufficient frequency

15. All putrescible waste shall be removed from the site with sufficient frequency to avoid nuisance from pests and odours.
Reason: To ensure provision of adequate waste disposal arrangements.

EFF0004 Use is not to cause air impurities

16. The operation of the premises is not to give rise to emissions of air impurities in contravention of the Protection of the Environment Operations Act 1997. Air emissions from the premises must not cause a nuisance from odours, nor be hazardous to human health or the environment.
Reason: To prevent loss of amenity to the area.

EWF0005 Management of waste storage facilities

17. All waste storage areas are to be maintained in a clean and tidy condition at all times.
Reason: To ensure the ongoing management of waste storage areas.

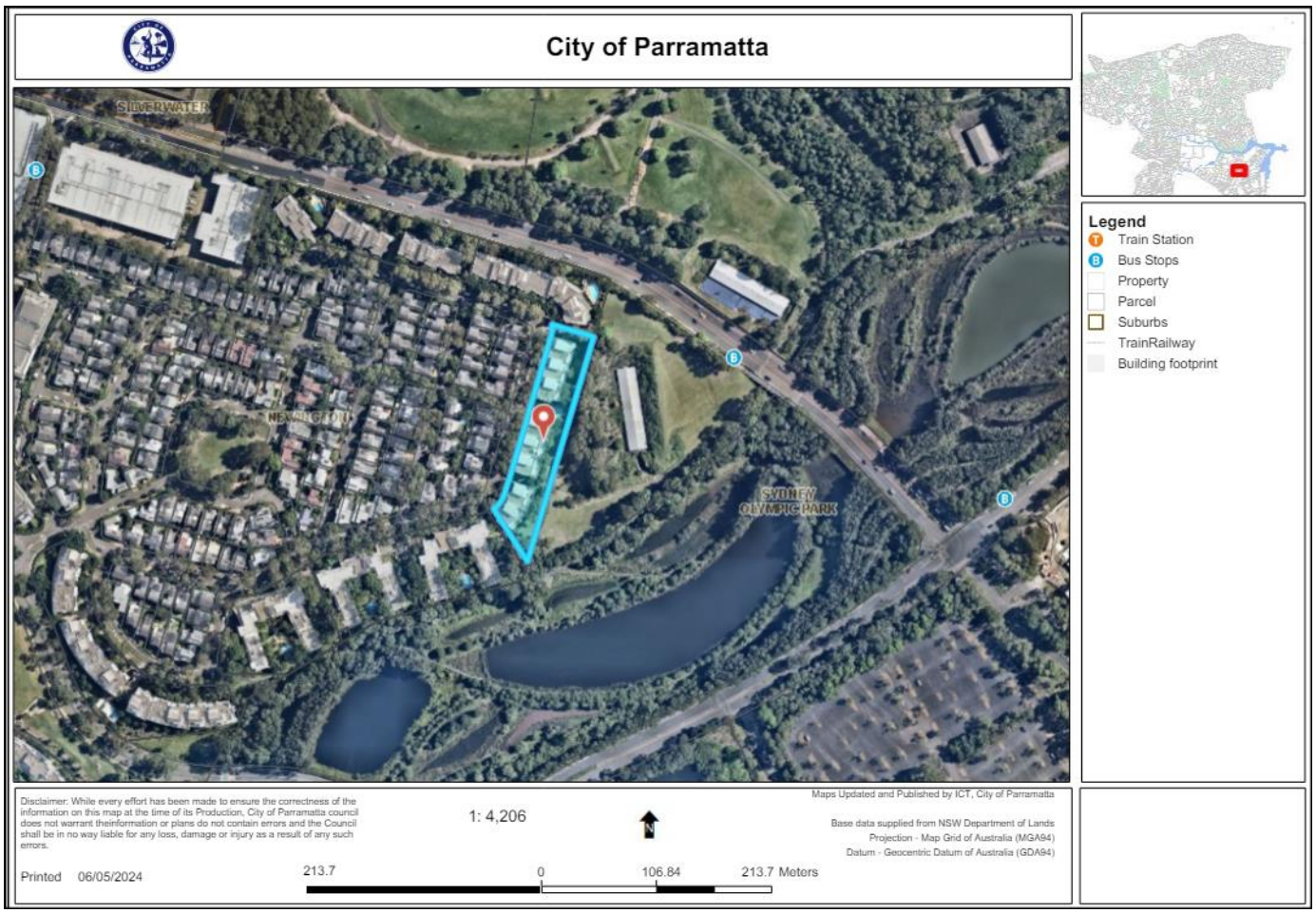
EWF0006 Storage of bins between collection periods

18. Between collection periods, all waste/recyclable materials generated on site must be kept in enclosed bins with securely fitting lids so the contents are not able to leak or overflow. Bins must be stored in the designated waste/recycling storage room(s) or area(s) between collection periods.
Reason: To ensure waste is adequately stored within the premises.

PF0004 External Plant/Air-conditioning noise levels

19. Any external plant/air-conditioning system must not exceed a noise level of 5dBA above the background noise level when measured at the boundaries of the property.
Reason: To minimise noise impact of mechanical equipment.

Date: **15 April 2024**
Responsible Officer: **Mathuran Stephen**


City of Parramatta
SILVERWATER
SYDNEY OLYMPIC PARK
Legend
Train Station
Bus Stops
Property
Parcel
Suburbs
TrainRailway
Building footprint
Disclaimer: While every effort has been made to ensure the correctness of the information on this map at the time of its Production, City of Parramatta council does not warrant theinformation or plans do not contain errors and the Council shall be in no way liable for any loss, damage or injury as a result of any such errors.
1: 4,206
Maps Updated and Published by ICT, City of Parramatta
Base data supplied from NSW Department of Lands
Projection - Map Grid of Australia (MGA94)
Datum - Geocentric Datum of Australia (GDA94)
Printed 06/05/2024
213.7 0 106.84 213.7 Meters

U10/11 Blaxland Avenue, Newington

CONTENTS TABLE	
Sheet Number	Sheet Name
A001	Cover Page
A002	Site Plan
A101	Existing Floor Plan
A102	Proposed Floor Plan

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DRAWING TITLE: COVER PAGE

PROJECT/CLIENT: U10/11 Blaxland Avenue, Newington

DATE: 26th Nov 2023

DRAWING NUMBER: A001

REVISION:

PAGE SIZE: A3

ISSUE: Project Status

DRAWN BY: CG. MIEAust, NSW Fair Trading, NER

Notes:

1. All dimensions are in millimetres.
2. All dimensions are to be checked on site.
3. Any discrepancy between the architectural drawing and other drawings relevant for construction should be notified before commencement.

*DO NOT SCALE THIS DRAWING

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A	FOR DA Lodgement	26/11/2023	CG

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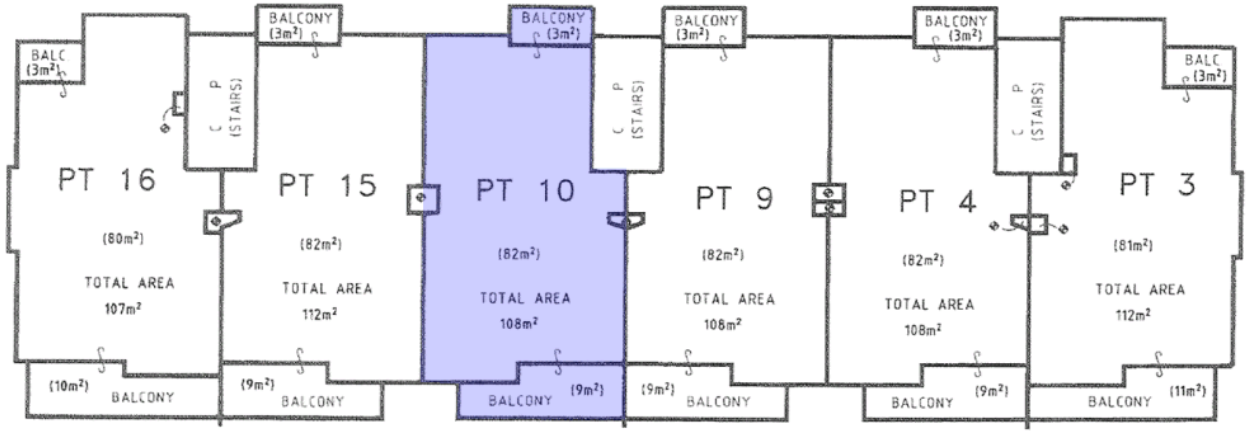

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Phone: 1300 093 712 Email: info@designandapproval.com.au Website: www.designandapproval.com.au

DRAWING TITLE: LOCATION MAP

PROJECT/CLIENT: U10/11 Blaxland Avenue, Newington

DATE: 26th Nov 2023

DRAWING NUMBER: A002

REVISION:

PAGE SIZE: A3

ISSUE: Project Status

DRAWN BY: CG. MIEAust, NSW Fair Trading, NER

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A	FOR DA Lodgement	26/11/2023	CG

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PLANNING PROPOSALS

21 MAY 2024

6.1 Gateway Request - Planning Proposal for land at 31 O'Connell Street and 9 Albert Street, North Parramatta 198

6.2 Gateway Request - Parramatta CBD Supplementary Matters Planning Proposal 909

6.3 Gateway Request - Planning Proposal for land at 53-61 Rawson St, Epping 1389

PLANNING PROPOSAL

ITEM NUMBER	6.1
SUBJECT	Gateway Request - Planning Proposal for land at 31 O'Connell Street and 9 Albert Street, North Parramatta
REFERENCE	F2022/03176 -
APPLICANT/S	Peterose Pty Ltd
OWNERS	Peterose Pty Ltd
REPORT OF	Senior Project Officer

PURPOSE

The purpose of this report is to seek the Local Planning Panel's advice to Council on a recommendation to progress a Planning Proposal for land at 31 O'Connell Street and 9 Albert Street, North Parramatta to the Department of Planning, Housing and Industry (DPHI) for a Gateway determination.

RECOMMENDATION

The Local Planning Panel (LPP) consider the following Council Officer recommendations in its advice to Council:

(a) That Council approve for the purposes of seeking a Gateway determination, the Planning Proposal for land at 31 O'Connell Street and 9 Albert Street, North Parramatta, which seeks the following amendments to Parramatta Local Environmental Plan (LEP) 2023:

1) Increase the Height of Buildings control from part 21 metres, part 28 metres and part 66 metres to part 30 metres, part 53 metres and part 77 metres (maximum height of approximately 22 storeys).
2) ii. Increase the Floor Space Ratio control from part 2.4:1 and part 3.3:1 to 3.9:1.

(b) That Council request the applicant to update the following documents, in accordance with this report, prior to the Planning Proposal being placed on public exhibition:
1) Traffic Impact Assessment
2) Stormwater Management Plan

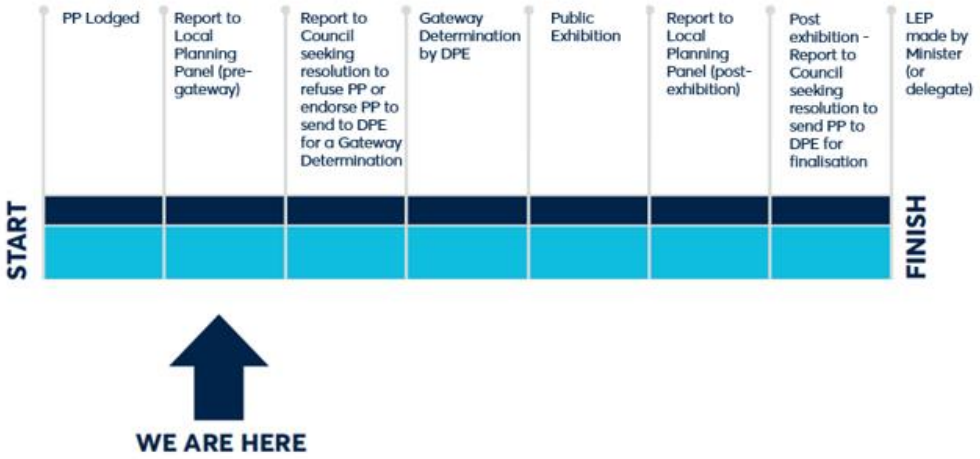
(c) That Council request the DPHI to provide Council with delegation to exercise its plan-making delegations for this Planning Proposal.

(d) That Council approve the draft site-specific Development Control Plan (DCP) for the purposes of public exhibition with the Planning Proposal.

(e) That a Planning Agreement be prepared in accordance with the applicant's Letter of Offer at **Attachment 12** and placed on public exhibition with the Planning Proposal and site-specific DCP.

(f) That Council authorise the CEO to correct any minor anomalies of a non-policy and administrative nature that arise during the plan-making process.

PLANNING PROPOSAL TIMELINE



SUMMARY

1. This report seeks the advice of the LPP on the progression of a Planning Proposal (**Attachment 1**) for land at 9 Albert Street and 31 O'Connell Street, North Parramatta to DPHI for Gateway determination.

2. The Planning Proposal seeks to amend the Parramatta Local Environmental Plan 2023 (PLEP 2023) to amend the Height of Buildings control from part 21 metres, part 28 metres and part 66 metres to part 30 metres, part 53 metres and part 77 metres (maximum height of approximately 22 storeys) and amend the Floor Space Ratio (FSR) control from 3.3:1 to 3.9:1.

3. The report also seeks the advice of the LPP on the progression of an associated site-specific Development Control Plan (SSDCP) (**Attachment 2**). Both documents are intended to be placed on public exhibition concurrently with an associated Planning Agreement.

BACKGROUND

4. The site was formerly proposed to be included in the Parramatta CBD Planning Proposal. However, it was removed from that Planning Proposal in 2021 by the (then) Department of Planning and Environment (Department), along with all land north of the Parramatta River when the Parramatta CBD Planning Proposal was finalised. In October 2022, the area was identified by the Department to be the subject of the *North Parramatta Place Strategy*.

5. On 9 February 2023, the applicant, Petrosa Pty Ltd, lodged a Planning Proposal with Council for land at 31 O'Connell Street and 9 Albert Street, North Parramatta seeking to increase the building height to 66m (approximately 18 storeys) and maximum floor space ratio (FSR) to 4:1.

6. The Planning Proposal was initially not progressed due to the Department's *North Parramatta Place Strategy*. In October 2023, the State Government advised that the subject site would no longer be part of the *North Parramatta Place Strategy*.

7. The State Government then determined not to progress with a *North Parramatta Place Strategy* and instead proceeded to finalise a Church Street North rezoning project focused on the Church Street corridor of the North Parramatta area. Following this change to the State Government's approach to the locality, Council officers and the applicant recommenced discussions on the progression of the Planning Proposal and SSDCP, which are the subject of this report.

SITE DESCRIPTION

8. The site (**Figure 1**) is located at 31 O'Connell and 9 Albert Street, North Parramatta. The site is legally described as Lot 1, DP998240 and Lot 1, DP 1143431. The site has an area of approximately 8,921sqm.

Figure 1. Subject Site

9. The site is currently vacant and adjoins two nursing homes to the west, being Southern Cross Care Marian Nursing Home and Lillian Wells Nursing Home.

10. The site is within approximately 400 metres walking distance from the Fennel Street Parramatta Light Rail stop and approximately 200 metres from the Prince Alfred Square Parramatta Light Rail stop.

11. The built form context of the neighbourhood is currently one to two storey single dwellings on the eastern side of O'Connell Street and predominantly medium and high-density housing on the western side of O'Connell Street.

12. The site is located within close proximity to the North Parramatta Heritage Conservation Area (HCA) to the east and various heritage items as shown in **Figure 2**.

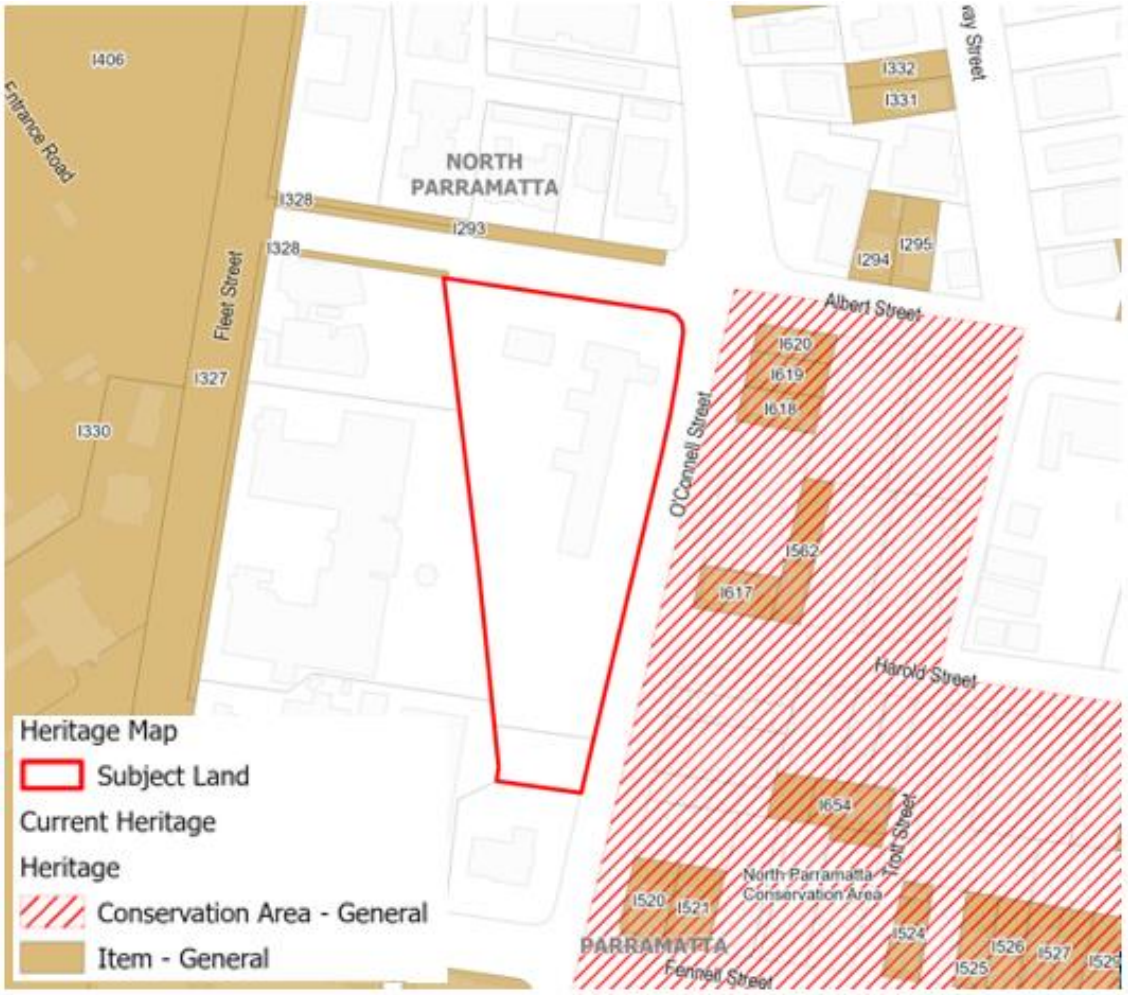


Figure 2. Subject site in context of the surrounding heritage items and conservation areas.

CURRENT PLANNING CONTROLS

13. The subject site is zoned MU1 Mixed Use under the provisions of the Parramatta Local Environmental Plan 2023 (PLEP 2023) as shown in **Figure 3**. The current zoning is to be maintained in the Planning Proposal.

Figure 3. Current Zoning Map

14. The site currently has a height limit of part 21 metres, part 28 metres and part 66 metres (maximum height of approximately 18 storeys) under the Height of Buildings (HoB) map (**Figure 4**). The current height is proposed to increase to part 30 metres, part 53 metres and part 77 metres (maximum height of approximately 22 storeys) under the Planning Proposal.

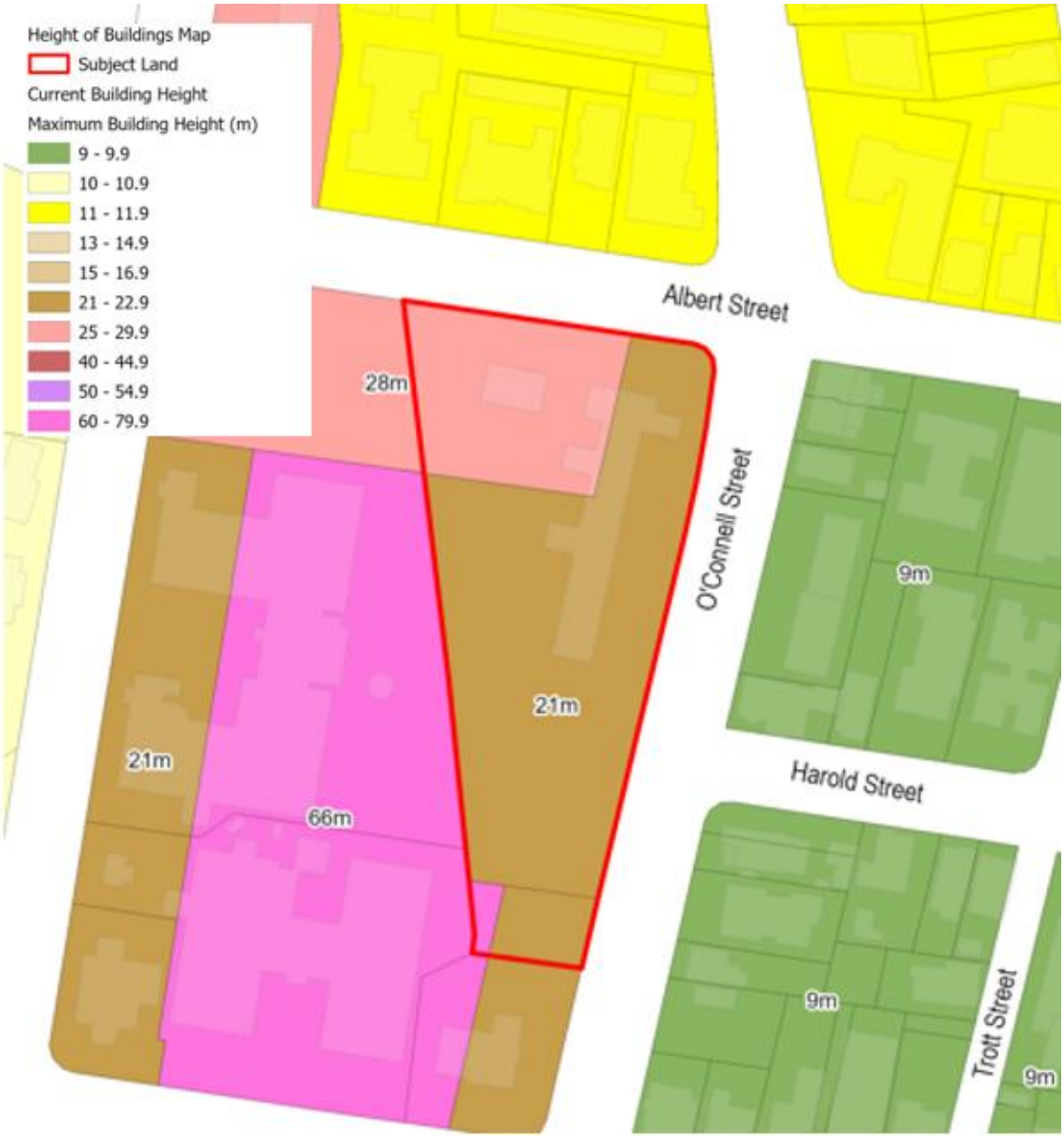


Figure 4. Current Height of Buildings

15. The site currently has a floor space ratio of part 2.4:1 and part 3.3:1 under the Floor Space Ratio (FSR) map (refer to **Figure 5**). The FSR is proposed to be increased to 3.9:1 under the Planning Proposal.

Figure 5. Current Floor Space Ratio

16. The applicable development control plan (DCP) for the site is Parramatta DCP 2023 Part 8.2.2 *Parramatta North Urban Transformation Precinct.* This precinct-specific section of the DCP came into effect in 2017 in response to the State Government's rezoning of the land in 2015.

PLANNING PROPOSAL

17. The Planning Proposal (**Attachment 1**) seeks to amend PLEP 2023 to enable redevelopment of the site for a mix of high density residential and retail uses. A total of 371 dwellings could be delivered should this Proposal proceed.

18. The Planning Proposal seeks to increase the height of buildings to 78m (approximately 22 storeys) and increase the FSR to 3.9:1. Refer to **Figures 6 & 7** respectively. A summary of the current and proposed land use controls is provided in **Table 1.**

	Existing Controls	Planning Proposal
Zoning	MU1 Mixed Use	MU1 Mixed Use
Height of Buildings	Part 21 metres, part 28 metres and part 66 metres (maximum of approximately 18 storeys)	Part 30 metres, part 53 metres and part 77 metres (maximum of approximately 22 storeys)
Floor Space Ratio	Part 2.4:1 part 3.3:1	3.9:1
Dwelling number	240* (approximately)	371 (an additional 131 dwgs)
Residential gross floor area (GFA	20,446sqm**	33,360sqm
Non-residential GFA	963sqm***	1,483sqm

Table 1. Current and proposed planning controls
* Using the Council officer's standard 85% efficiency rate.
** When applying a 2.4:1 FSR across the entire site.
*** Calculated at 4.5% of the total 21,410sqm GFA.

19. The height of building controls is proposed to change to part 30m, part 53m and part 77m (**Figure 6**).

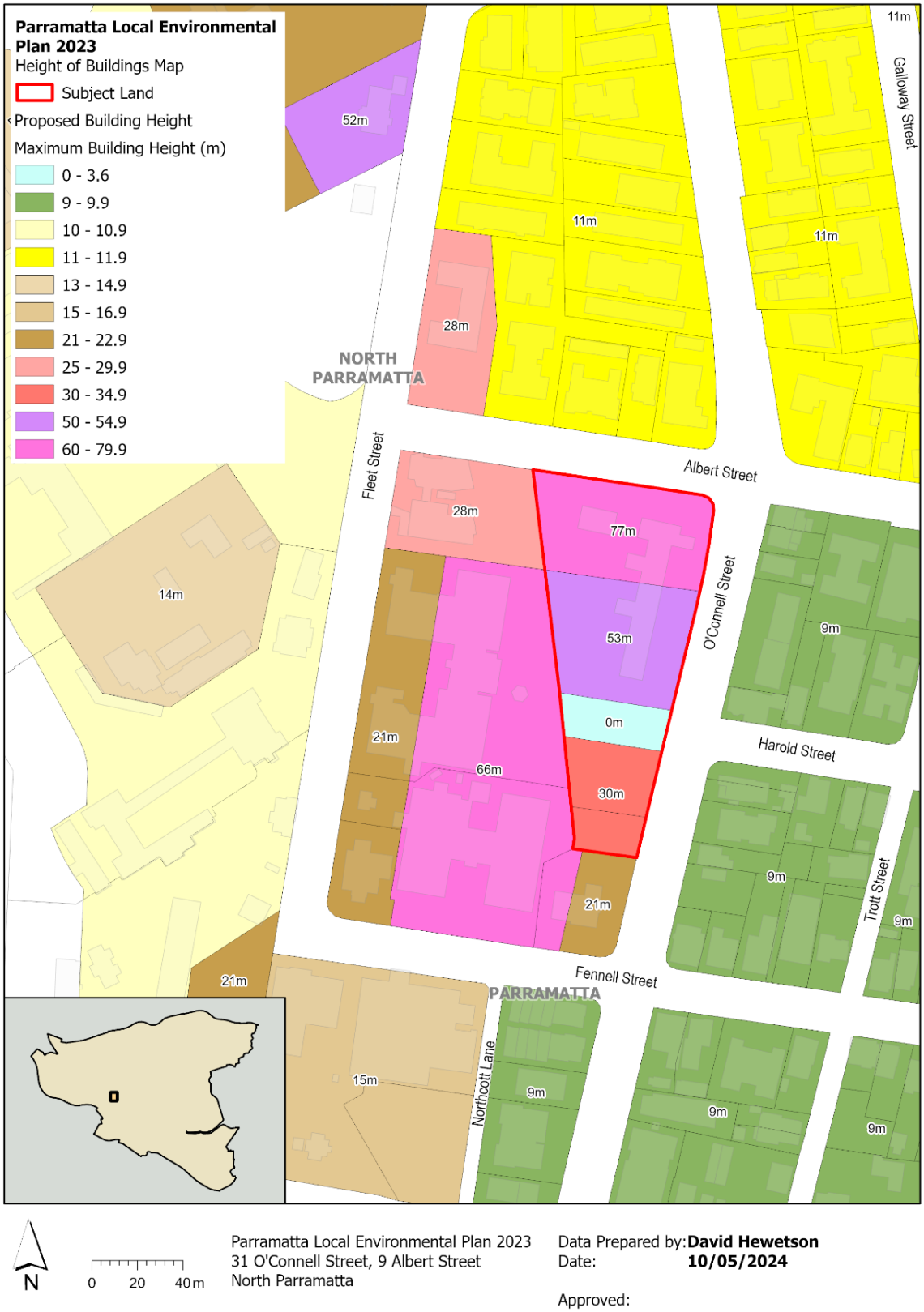


Figure 6. Proposed Height of Buildings Map

20. The floor space ratio controls are proposed to change to 3.9:1 (**Figure 7**)

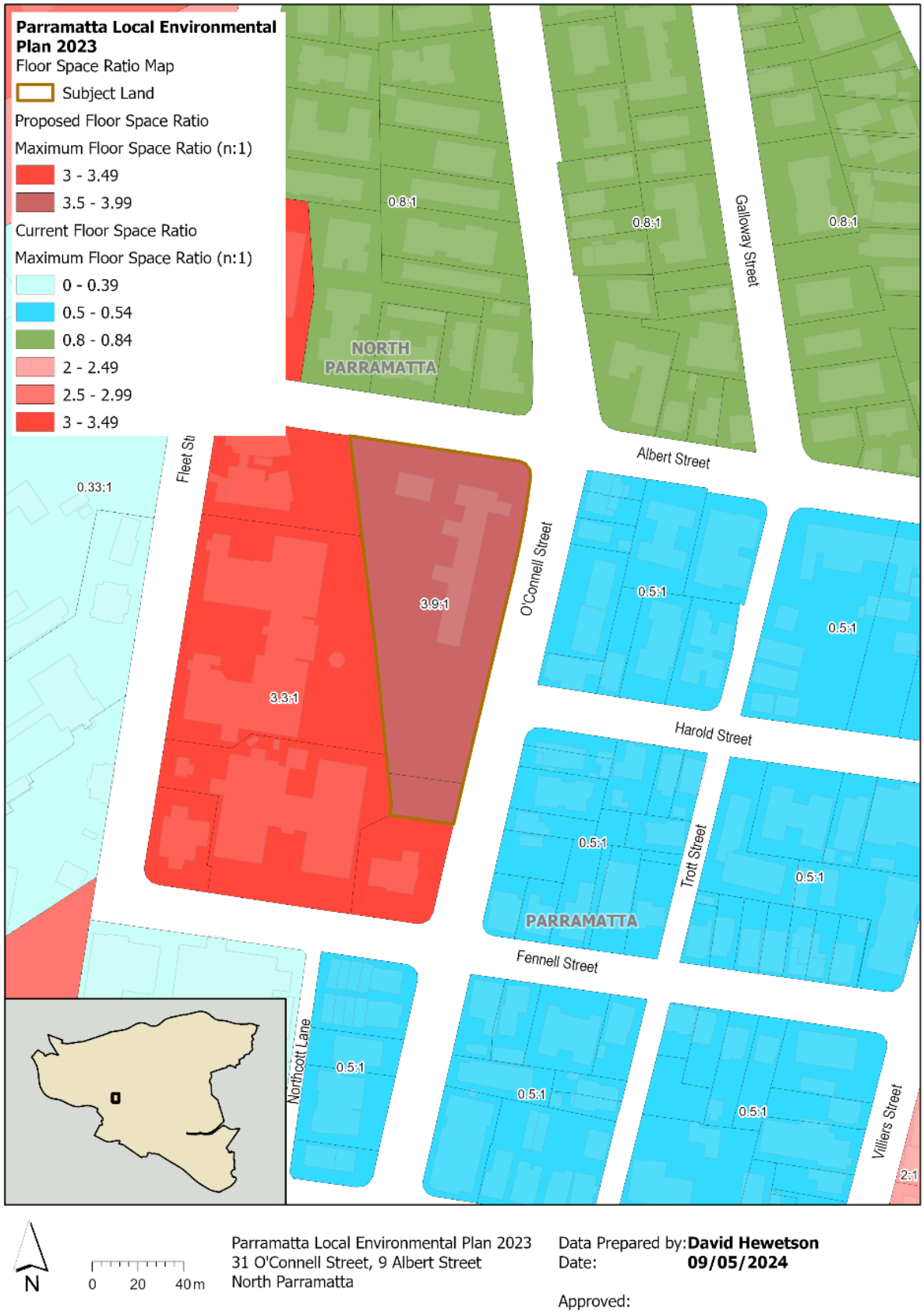


Figure 7. Proposed Floor Space Ratio

STRATEGIC MERIT ASSESSMENT

State Planning Policies and Strategies

Greater Sydney Region Plan and Central City District Plan

21. In March 2018, the, then, Greater Sydney Commission (GSC) released the Greater Sydney Region Plan: A Metropolis of Three Cities (Region Plan), a 20-year plan which outlines a three-city vision for metropolitan Sydney to the year 2036. The Central City District Plan (District Plan) was subsequently released by the GSC to implement the Region Plan. The Sydney Plan and District Plan set out the key priorities and actions for this District by aiming to rebalance growth and deliver its benefits more equally and equitably to residents across Greater Sydney.

22. An assessment of the Planning Proposal against the Sydney Plan and District Plan identifies the Planning Proposal is largely consistent with the Plans in that it will provide for additional housing, is within walking distance to public transport, public open space and retail and commercial services. A full analysis of how this Proposal demonstrates consistency with these plans is included in the Planning Proposal (**Attachment 1**).

Parramatta North Urban Transformation Precinct (PNUT)

23. The site is identified as H3 within the Parramatta North Urban Transformation precinct (known as PNUT) (**Figure 8**). In 2015, UrbanGrowth, prepared a development proposal for the Parramatta North Urban Renewal Area. The planning controls were made via a State Environmental Planning Policy (SEPP) in 2015.

24. PNUT is a mixed-use renewal precinct and has a unique heritage, landscape and river setting. The precinct has a long history of indigenous, early colonial and later government institutional uses and the aim is to facilitate long term use through careful adaptive reuse, conservation and preservation.

25. The core of the precinct contains key built and landscape elements of the site that include, among others, the former Parramatta Female Factory. The subject site is not within the PNUT core area.

26. The site is therefore subject to specific development controls for PNUT within Part 8.2.2 of Parramatta Development Control Plan (DCP) 2023. The DCP includes controls relating to design quality, subdivision, public domain and open space, site access and parking, circulation and connectivity, street network, GFA allocation, biodiversity, heritage and archaeology, key views and landmarks, built form and massing. These controls and the need for the proposed DCP amendment to support the Planning Proposal are considered later in this report.

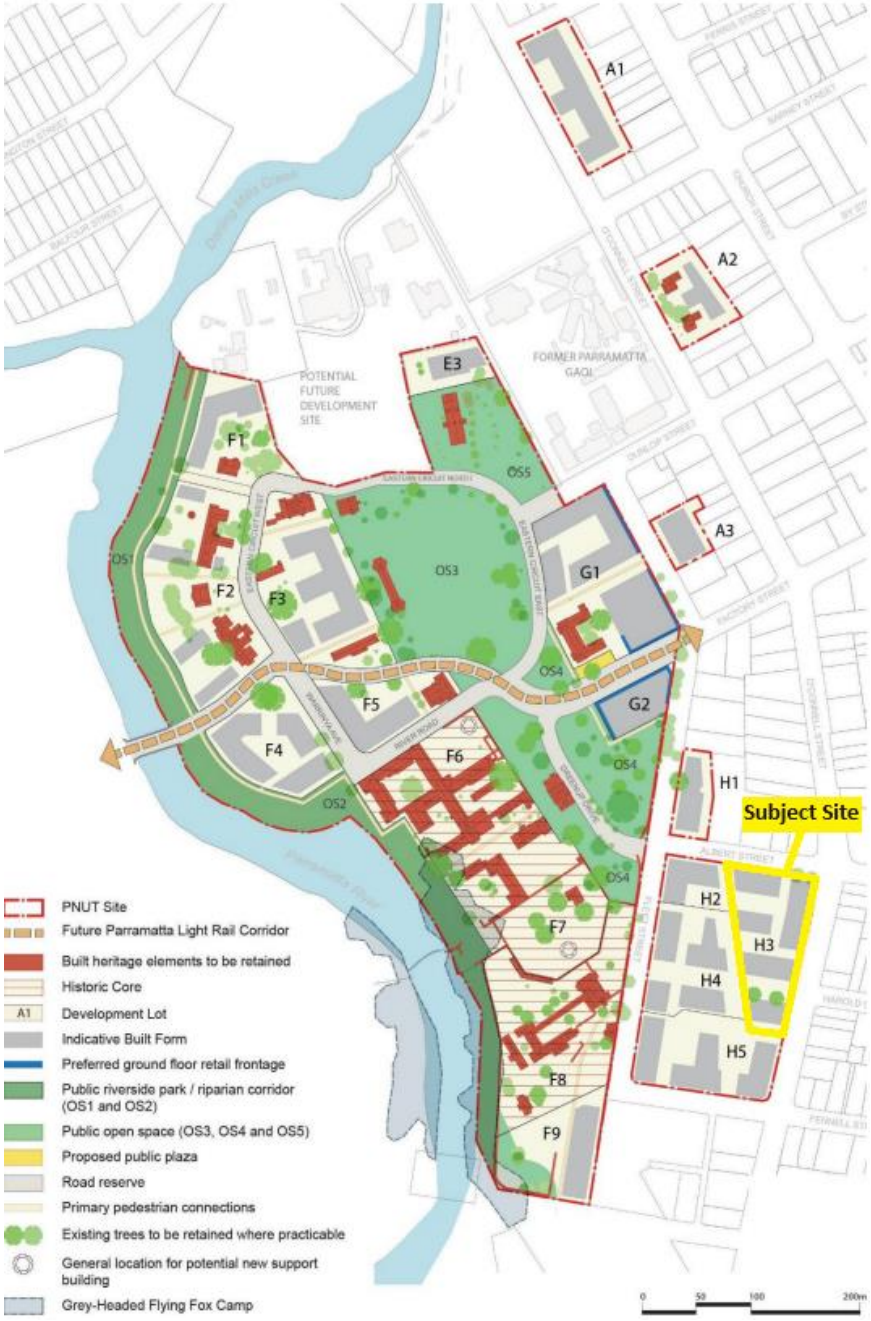


Figure 8. Location of subject site within PNUT

Local Strategies

Local Strategic Planning Statement and Local Housing Strategy

27. The City of Parramatta Local Strategic Planning Statement (LSPS) sets out Council's long-term vision for land use planning and responds to broader priorities identified in the District Plan and integrates with Council's Community Strategic Plan. The LSPS provides greater weight to strategic planning in the broader plan making process and any new Planning Proposal must justify any inconsistency with this framework and the supporting Local Housing Strategy (LHS).

28. The Proposal is considered consistent with numerous directions of the Planning Priorities within Council's LSPS. Details on how the Proposal addresses the requirements of the LSPS are provided at **Attachment 1**.

29. The Proposal is also considered to be consistent with Council's LHS by delivering housing and employment services to meet the needs of the future community. Further details of how the Proposal demonstrates consistency with the LHS are provided at **Attachment 1**.

30. The Minister for Planning has recently written to all councils and planning panels asking them to *'prioritise the delivery of housing when assessing development applications and rezoning schemes, so that the entire planning system is geared to addressing the housing shortfall'.* The Minister further asks that *'...council teams prioritise the opportunity to deliver homes as part of merit considerations where, on balance, dwelling numbers may warrant a scale or built form that is different to or greater than the outcome originally anticipated'.* This Proposal has been prioritised consistent with this request.

SITE SPECIFIC MERIT ASSESSMENT

31. The proposed land uses are permissible under the current zoning of the site and its redevelopment will provide increased housing supply and supporting retail facilities to serve the locality.

32. The Proposal demonstrates site-specific merit given the site's proximity to the Parramatta CBD, public transport, education and health facilities and public open space, making it a suitable location for increased density.

Urban Design

33. The applicant has submitted an Urban Design Report (prepared by DKO Architecture) (see **Attachment 3**) with the Planning Proposal. Council officers have reviewed the report and consider that the applicant's concept design suitably addresses built form and height transition to the adjacent Heritage Conservation Area (HCA). Refer to **Figure 9** showing the applicant's concept design. Note that the surrounding development depicted as semi-transparent is speculative only and is based on what could potentially be achieved on these sites using the currently applicable planning controls.

Figure 9. Applicant's concept design

34. In response to concerns raised by Council officers relating to the potential impacts of the proposed development on the HCA and the lower scale development to the west, design controls have been incorporated into the SSDCP addressing setback requirements for both ground floor podium and the upper levels; the distribution of stepped building heights across the site including location of tower elements; landscaping and deep soil zones; and building separation. As a result, it is considered that an appropriate outcome can be achieved on the site that responds to the surrounding context.

35. The PLEP 2023 Height of Buildings map (**Figure 6**) is proposed to be amended to apply specific height controls across the site to ensure that the height distribution eventuates as required and envisaged. A height map in storeys has also been prepared and included in the SSDCP (**Figure 10**).

Figure 10. Proposed SSDCP height map

36. The two tower elements of 22 storeys and 14 storeys are to be located in the core of the site away from the O'Connell Street frontage to provide a height transition to the surrounding development and reduce any potential negative visual impacts on the surrounding area and nearby HCA.

37. The opportunity of providing a publicly accessible through-site link between O'Connell Street and Fleet Street (**Figure 10**) will align with Harold Street and is to be at least 12m wide. On the development of the land to the west, thus providing the connection to Fleet Street, this will improve site permeability not only for future residents of the development but residents and pedestrians of the area in general.

Heritage

38. The subject site is the former North Parramatta Infants School, which was not a heritage listed item and has since been demolished. Therefore, the site has no heritage significance. However, the site is located adjacent to and west of the North Parramatta HCA (**Figure 2**).

39. Despite some redevelopment, primarily in the 1960s comprising three-storey walk-up apartment buildings, the HCA contains 46% of the dwellings that existed within the area in 1895 and therefore is considered an area that requires protection.

40. A Heritage Assessment prepared by Paul Davies Architects and Heritage Consultants has been provided in support of the Planning Proposal (**Attachment**

4). The Heritage Assessment presents an analysis of the impact of the development on the North Parramatta HCA and heritage items.

41. Overall, the assessment supports the Planning Proposal and acknowledges that the design of the proposed development should respond to the HCA and establish a relationship across O'Connell Street that is an appropriate scale.

42. The assessment states that the proposed concept design has been developed to demonstrate that a good built form can be achieved on the site that relates both to the HCA to the east and to the heritage items further west. The assessment notes that in relation to the HCA, the street separation that O'Connell Street provides, provides an opportunity to establish a viable urban form of larger scale on the subject site.

43. Council's Heritage Advisor has raised concern with the potential negative impact on the existing character of the HCA, specifically the proposed tower creating a strong contrast with the existing low and medium density residential development surrounding the site.

44. In response to the concerns, controls have been included in the SSDCP primarily relating to building design, setbacks, landscaping and building heights to manage the scale of development. The increased setbacks on the site create greater separation between the proposed development and the HCA and establish a street wall height that, although higher and denser than the built form within the HCA, will also aim to reduce the perception of density. The height of the tower is not considered likely to have a negative impact on the HCA as its height will not be perceived from ground level due to the use of podiums.

45. Further, the assessment notes that the intent of a HCA is to capture the heritage values of a streetscape from within the HCA and to ensure new development within the HCA is sympathetic to the existing character and achieve consistency in the streetscape. For new development near a HCA, the intent is to create a clear distinction between the new and existing development rather than dictate the built form. The proposed redevelopment provides a clear transition between the HCA and non-HCA areas through the use of setbacks, street wall heights, landscaping and materials as included in the SSDCP controls.

46. The initial Planning Proposal was referred to Council's Heritage Advisory Committee on 2 May 2023. The Committee agreed not to support the Planning Proposal due to proximity to and impact on the HCA and at the time, considered premature due to the *North Parramatta Place Strategy* having not yet been finalised.

47. The revised Planning Proposal will be considered by the Heritage Advisory Committee at its 6 June 2024 meeting. Council officers consider the revised proposal and the associated Heritage Statement identify how the Committee's earlier expressed concerns can be addressed.

48. Despite the heritage constraints and concerns, it is considered that redevelopment as proposed under the Planning Proposal can be achieved in a manner sensitive to the surrounding context. The SSDCP, which will amend the PNUT DCP, will incorporate appropriate development controls to ensure that

redevelopment does not result in an inappropriate outcome for the site and surrounding existing development.

49. The site is not within the area of high sensitivity to the World Heritage Listed Old Government House and Domain precinct.

Open Space

50. Council's Parks and Open Space team has reviewed the Planning Proposal and notes that the subject site is located close to significant existing public open spaces Belmore Park and Parramatta Park, and future new parkland to be provided within the broader PNUT precinct. Nonetheless, the potential of approximately 770 new residents (2.1 people per household) in total (an increase of approximately 266 residents above what could potentially be achieved under the current controls) should the Proposal proceed will place increased demand on the use of these open space areas.

51. Although the proposed development incorporates new communal open spaces, principally the adjoining through-site link and atop the podiums, these have limited recreational capacity and future residents will rely on the nearby public open spaces to meet their recreational needs. As a result, the applicant proposes to make a contribution towards Council's proposed upgrade of Belmore Park as part of an associated Planning Agreement. Details of the draft Planning Agreement are provided later in this report.

Traffic and Transport

52. Council's Traffic and Transport Planning teams undertook a detailed review of the Planning Proposal and supporting Traffic Impact Assessment (TIA) prepared by Traffix (**Attachment 5**). No objection has been raised to the Proposal on traffic and transport grounds noting that the subject site is within proximity to light rail, bus services and heavy rail.

53. The TIA should be updated prior to public exhibition to address the following:
    i. Update the trip generation data including revalidation of the AM trip rate per hours (via surveys or advice from TfNSW).
    ii. Recalibration of traffic modelling and future model year assessment.
    iii. Provide a Green Travel Plan.
    iv. Review car and truck access to ensure all vehicle movements are via Albert Street.

54. All site-specific parking rates and traffic-related requirements will be contained within the SSDCP.

Landscape and Arboricultural

55. A Landscape Report prepared by Site Image Landscape Architects has been provided in support of the Planning Proposal (**Attachment 6**). The Landscape Report shows the proposed outdoor recreational grounds and open space to be provided.

56. An Arboricultural Impact Assessment prepared by McArdle Arboricultural Consultancy has been provided in support of the Planning Proposal

(**Attachment 7**) to assess tree health and retention value and to evaluate the potential impacts on trees by the proposed development. The assessment recommends the retention of several existing trees and replacement of tree removals with new trees.

57. Relevant controls have been incorporated into the SSDCP to ensure the provision of deep soil zones, retention of existing mature trees especially those of 'high retention value', and appropriate tree planting is undertaken on the site should the Planning Proposal proceed. This will be addressed in detail at the development applicant stage.

Flooding and Stormwater

58. A Flood Impact Assessment (FIA) letter prepared by Telford Civil has been provided in support of the Planning Proposal (**Attachment 8**). The FIA shows the potential flood impact on the development. Overall, the assessment concludes the proposed development will not impose any additional risks to the occupants or neighbouring properties as it will cause no loss in flood storage or water diversion up to the PMF storm event. It notes that the proposed development complies with Council's requirements and therefore provision of a flood impact and risk assessment report is not required.

59. Council's Catchment and Development Engineer notes that the site is not subject to the 1% AEP or PMF (**Figure 11**), however may be affected by overland flow. The applicant should therefore update the Stormwater Management Plan as follows:
    - Remove references to PLEP 2011 and Council's Development Engineering Guidelines and respond instead to the requirement of PDCP 2023.
    - Show that the development will not have adverse flooding impacts on adjoining sites.
    - Show that the total stormwater discharge is 10% less than pre-development.
    - Show maximum site permeability and minimum impermeability.
    - Demonstrate that the deep soil zones are maximised.
    - Demonstrate that landscaped areas will be used to manage runoff and treat it to achieve water quality objectives as per PDCP 2023.
    - Demonstrate that rainwater will be captured and used on-site as a substitute water supply.

60. Council's Catchment and Development Engineer considers that this information can be provided prior to exhibition and should not prevent the Proposal from proceeding to Gateway determination.

Figure 11. 1% AEP and PMF flooding

Economic Development

61. A Retail Needs Assessment and Impact Test prepared by Macroplan has been provided to support the Planning Proposal (**Attachment 9**). The Retail Needs Assessment is an evaluation of the scale and mix of retail uses considered suitable for a proposed supermarket anchored neighbourhood centre at the subject site. It also provides an overview of the types of non-retail uses considered supportable. From an impact perspective, the assessment concludes that the estimated trading impacts arising from the development of retail provision on other centres in the surrounding area are likely to be minor and are unlikely to threaten their viability.

62. Moreover, additional retail and commercial facilities on-site will benefit existing and future local residents and enable greater street activation that a standalone residential development. Council's Economic Strategy team has reviewed the report and support the provision of local retail and commercial uses outside of the Parramatta CBD to service the growing local populations. The proposed provision of non-residential floor space (1,483sqm) is also supported.

Noise Impact

63. A Noise Impact Assessment prepared by Pulse White Noise Acoustics has been provided in support of the Planning Proposal (**Attachment 10**). The Noise Impact Assessment examines the potential surrounding environmental noise intrusion impacts from the development and noise emissions on nearby receivers. Overall, the assessment concluded the proposed development would be acceptable from an acoustic perspective.

64. Council's Environmental Health Compliance team has reviewed the report and determined the increase in building height and particularly the inclusion of a childcare centre will likely result in an increase in local ambient noise levels and may pose nuisance issues if not managed appropriately. It is considered however that these issues can be addressed through appropriate measures at the DA stage.

Contamination

65. A Detailed Site Investigation was prepared by EI Australia has been provided in support of the Planning Proposal (**Attachment 11**). The Detailed Site Investigation is an assessment of potential and degree of site contamination and recommend suitability of the site for the future land use. No change to the existing MU1 Mixed Use zone is proposed as part of this Proposal and overall, the investigation concludes the site can be made suitable for mixed-use development.

66. Council's Environmental Health Compliance team reviewed the report and consider that the site could be rendered suitable for the proposed uses under the Planning Proposal provided the recommendations of the Detailed Site Investigation are adopted and undertaken at DA stage.

SITE-SPECIFIC DEVELOPMENT CONTROL PLAN

67. This site is within the PNUT precinct and is subject to part 8.2.2 Parramatta North Urban Transformation Precinct within PDCP 2023. It is proposed that this part be amended to include controls specifically for this site to address the site's characteristics and ensure an appropriate development outcome is achieved on the site. Should there be a discrepancy between the general PNUT and PDCP 2023 controls and those specific to this site, the site-specific controls will prevail.

68. The SSDCP (**Attachment 2**) includes controls relating to the following aspects:
    - Built form and massing.
    - Building heights.
    - Setbacks.
    - Building separation.
    - Building design.
    - Ground floor and active frontages.
    - Access and parking.
    - Materials.
    - Apartment Design Quality.
    - Public Domain.
    - Communal open space.
    - Landscaping.

69. It is intended that the SSDCP will be placed on public exhibition concurrently with the Planning Proposal and Planning Agreement.

PLANNING AGREEMENT

70. A Planning Agreement Letter of Offer (**Attachment 12**) has been submitted by the applicant proposing to deliver public benefits and infrastructure to help

support the community needs generated by the additional density of development proposed on the site under the Planning Proposal.

71. The following items are included in the applicant's Letter of Offer:
    i. 4 x 1 bedroom and 1 x 2 bedroom Affordable Rental Housing (ARH) apartments dedicated to Council in perpetuity.
    ii. A $250,000 monetary contribution towards Council's planned upgrades to Belmore Park.
    iii. An easement for the land subject to the proposed through-site link (no ascribed value).

72. Council officers support the provision and dedication of the proposed ARH dwellings which is in accordance with the requirements of Council's Affordable Housing Action Plan and draft Affordable Rental Housing Policy. The contribution towards the Council's currently planned Belmore Park upgrades is also supported. The proposed monetary contribution towards the Belmore Park upgrades will assist in delivering the Stage 2 works identified in the park's masterplan, for which funds have not yet been allocated.

73. The Proposal will be subject to Section 7.11 / 7.12 development contributions in accordance with Council's Outside CBD Development Contributions Plan (2021), in addition to the Planning Agreement.

74. It is proposed that a Planning Agreement be drafted based on the applicant's Letter of Offer and exhibited concurrently with the Planning Proposal and DCP amendments.

PLAN MAKING DELEGATIONS

75. New delegations were announced by the then Minister for Planning and Infrastructure in October 2012, allowing councils to make LEPs of local significance. On 26 November 2012, Council resolved to accept the delegation for plan-making functions. Council has resolved that these functions be delegated to the CEO.

76. It is recommended that Council request that delegation be granted to the CEO by the Department on this occasion. When a council is not granted plan-making delegations then DPE is responsible for liaising with Parliamentary Counsel to finalise the LEP amendment should it be adopted by Council for completion post-exhibition.

FINANCIAL IMPLICATIONS FOR COUNCIL

77. Should Council resolve to proceed with the Planning Proposal, the financial implications for Council include costs associated with the exhibition process, which include advertising and landowner notification by mail out. These costs will be funded from the City Planning and Design budget.

78. The applicant has paid the relevant fee to cover the cost of preparing the DCP amendment and it is not anticipated that costs will be incurred by Council.

79. As per Council's Planning Agreement Policy (2018), the costs of undertaking the legal drafting of the Planning Agreement will be paid by Council and recouped from the applicant.

CONCLUSION

80. Council officers have assessed the Planning Proposal and consider that the Planning Proposal has strategic and site-specific merit and should proceed to a Gateway determination.

NEXT STEPS

81. It is recommended the Parramatta Local Planning Panel support the Council Officer recommendation that the Planning Proposal (**Attachment 1**) be supported for the purposes of seeking a Gateway Determination.

82. Following the Parramatta Local Planning Panel's consideration of the recommendations of this report, the matter will be reported to an upcoming Council meeting along with the Panel's advice.

Amberley Moore
Senior Project Officer

Carmel O'Connor
Team Leader Land Use Planning

David Birds
Group Manager, Major Projects and Precincts

Jennifer Concato
Executive Director City Planning and Design

ATTACHMENTS:

1	Applicant's Planning Proposal	69 Pages
2	Site-Specific Development Control Plan	
3	Urban Design Report	50 Pages
4	Heritage Assessment	17 Pages
5	Traffic Impact Assessment	59 Pages
6	Landscape Design Report	17 Pages
7	Arboricultural Impact Assessment	42 Pages
8	Stormwater Management Report	12 Pages
9	Retail Needs Assessment	30 Pages
10	Noise Impact Assessment	39 Pages
11	Detailed Site Investigation (contamination)	338 Pages
12	Planning Agreement Letter of Offer	3 Pages

REFERENCE MATERIAL

think planners

Planning Proposal to amend Parramatta Local Environmental Plan 2023

9 ALBERT STREET & 31 O'CONNELL STREET NORTH PARRAMATTA

APRIL 2024

QUALITY ASSURANCE	
Project:	Planning Proposal
Address:	31 O'Connell and 9 Albert Street, North Parramatta
Council:	City of Parramatta
Author:	Think Planners Pty Ltd

Date	Purpose of Issue	Rev	Author	Authorised
December 2022	Internal Review	A	EJ	AB
December 2022	Issue to Client Review	B	AB	AB
December 2022	Original Submission	C	EJ	AB
November 2023	Internal Review	D	EJ/BC	AB
November 2023	Revised submission	E	EJ	AB
February 2024	Issue to Client – RFI update	F	BC	AB
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INTRODUCTION

The purpose of this Planning Proposal is to explain the intended effect and provide a justification for a proposed amendment to the Parramatta Local Environmental Plan 2023 (Parramatta LEP 2023) as well as demonstrate the strategic merit of the amendment proceeding.

This Planning Proposal seeks to amend the Parramatta LEP 2023 to allow for the redevelopment of the site for the purposes of mixed use and high-density development by:

- **Amending the maximum height of buildings map to permit 78m**
- **Amending the maximum floor space ratio map to permit 3.9:1**

The Planning Proposal relates to 31 O'Connell and 9 Albert Street, North Parramatta referred to within this document as the '*subject site'*. The subject site is a highly visible location at the northern western edge of the Parramatta CBD. The site is strategically located near the river and key transport connections including Parramatta Light Rail and Bus Routes. The site will have visibility from the Westmead Health and Innovation Precinct and the highly active Parramatta Park and Parramatta River foreshore.

The site is located within proximity to employment opportunities, educational establishments, recreational activities and public transportation including Parramatta Female Factory, Parramatta CBD eat street as well as the new light rail station, Ngara station.

Additionally, the site is in close proximity to Parramatta North Public School, St Patrick's Primary, Our Lady of Mercy College Parramatta, Westmead hospital and more broadly all the services, facilities and opportunities of Parramatta CBD.

The amendments proposed in this Planning Proposal are specific to the site and will facilitate a new high-quality mixed-use development that will contribute to the vitality and activation of this precinct along with additional housing supply at the edges of the Parramatta City Centre. The Planning Proposal will contribute to the renewal of the CBD and character of Parramatta. The proposed amendments are driven by a desire to deliver a better built form outcome for the site and has been the subject of a design review by DKO Architects and heritage guidance by Paul Davies.

The proposed amendments are driven by a desire to deliver a superior urban design outcome for the site which addresses Council's vision for height and density which is consistent with the desired future character of Parramatta.

The proposed amendments to planning controls will facilitate the delivery of high quality development contributing to much needed housing supply within this strategic centre.

The Planning Proposal has been prepared in accordance with Section 3.33 of the Environmental Planning and Assessment Act 1979 and the Department of Planning and Environment's document Local Environmental Plan Making Guideline (August 2023).

The Planning Proposal originally submitted and as refined is supported by the following supporting documents.

1. Urban Design Report *by DKO Architects*

   Note:

   - *Includes Visual Impact Assessment*

2. Site Specific Development Control Plan *by Think Planners*
3. Wind Impact Assessment *by Windtech*
4. Integrated Water management Plan *by Telford Civil*
5. Survey Plan by TTS
6. Traffic & Transport Impact Assessment *by Traffix*
7. Green Travel Plan *by Traffix*
8. Retail Needs Assessment *by Macroplan*
9. Noise Impact Assessment *by Pulse White Noise Acoustics*
10. Landscape report *by Site Image Landscape Architects*
11. Arboricultural Impact Assessment *by McArdle*
12. Heritage Impact Assessment *by Paul Davies*
13. Aboriginal Heritage Impact Assessment *by Extent Heritage*
14. Geotechnical Investigation Report *by Douglas Partners*
15. Social Impact Assessment *by Think Planners*
16. Detailed Site investigation *by EI Australia*

This Planning Proposal is submitted to Council due to site specific conditions that are addressed in this Planning Proposal. This includes –

- The role of the site and its contribution to the outcomes planned for in the PNUTS area.
- The adjoining site to the west being redeveloped for a lower scale building than that identified in the planning controls.
- Responding to the Heritage Conservation Area east of the site.
- The site comprising a large, consolidated parcel in single ownership, located on the O'Connell Street thoroughfare.

Support for the Planning Proposal is sought; and the subsequent referral to the Department of Planning and Environment for Gateway determination and public exhibition.

PLANNING PROPOSAL MERITS, INFRASTRUCTURE AND COMMUNITY BENEFITS

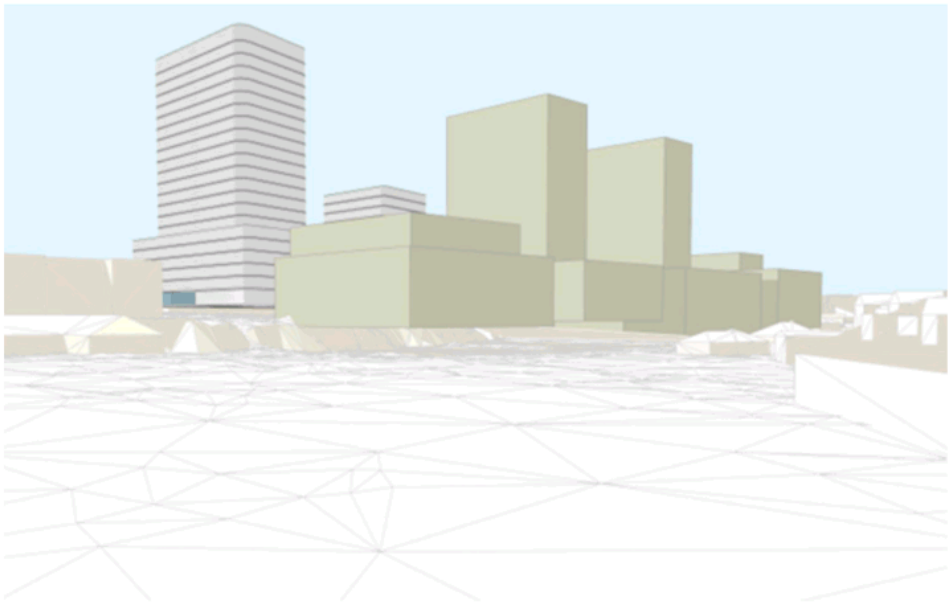
The Planning Proposal seeks to deliver the following key benefits:

- The Planning Proposal for 31 O'Connell and 9 Albert Street responds to the earlier **urban design analysis** conducted by the Department of Planning and Environment for the Parramatta North Urban Renewal area.
- The proposed amendments to Height is consistent and FSR is similar to existing controls on adjoining lands, and will contribute significantly to the housing stock of North Parramatta. Montages overleaf demonstrate the consistency of the proposed built form with the adjoining built form
- Importantly, the Planning Proposal is **responsive to the immediate built form** and urban design factors /context that exist. The site sits within a comfortable scale that is commensurate with surrounding buildings responding to the topography and surrounding heritage items both local and state.
- The Planning Proposal is responsive to the **established character, street wall heights and building heights** responding to the surrounding heritage items and conservation areas on O'Connell Street and the Parramatta Female Factory Precinct.
- The planning proposal responds to the surrounding heritage items and conservation areas and will facilitate the transition between the Heritage Conservation Area to the east and the urban renewal area. This is supported by the heritage assessment attached as part of this submission.
- The building envelopes illustrated in the Urban Design Report by DKO Architecture demonstrates a **high standard of design and amenity** can be achieved on the site. The scheme responds to the principles in the Apartment Design Guidelines for separation and privacy. The scheme has benefited from urban design advice from City of Parramatta and the Parramatta DCP.
- The proposal will ensure the delivery of upgraded pedestrian links along all street frontages and a new through-site link to **enhance the pedestrian environment** including the safety of people accessing the site and accessing surrounding land.
- The proposal delivers a **variety of housing opportunities** within Parramatta CBD. This enables the opportunity to create a genuine 30-minute city where housing is well connected to public transport, health services, education services, employment, and recreational facilities.
- The proposal will deliver retail and commercial floors space within North Parramatta, **contributing to street activation**.
- The proposal comprises **new housing supply and choice** with access to jobs, services and public transport.

The subject land parcel is ideal to accommodate the proposed development as it is located within an accessible area and is consistent with the evolving character of

developments within Parramatta. Furthermore, the development proposes to provide the opportunity to deliver housing in a location which is experiencing an intensification in terms of development as well as considering the site's proximity to educational establishments, employment opportunities and recreational activities.

Montage 1: Proposed development seen from the west, showing permissible height on adjoining site (DKO)



SITE AND LOCALITY DESCRIPTION

LEGAL DESCRIPTION

The site is located at 31 O'Connell and 9 Albert Street, North Parramatta. The site is legally described as Lot 1, DP998240 and Lot 1, DP 1143431. The site has an area of approximately 8,921m².

The site is currently vacant and adjoins two Nursing Homes to the west, Southern Cross Care Marian Nursing Home and Lillian Wells Nursing Home. Both nursing homes have undergone or going through extensive upgrade and renovation works and are not intending to redevelop their site in the near future.

Currently 31 O'Connell Street has driveway access from O'Connell Street and 9 Albert Street from Albert Street. The proposed development will close the driveway access on O'Connell Street to support efficient traffic flow.

The following photographs overleaf and within the following pages provide a visual understanding of the site and its relationship to the street. It is noted that the site is currently vacant, with all buildings previously on the site having been demolished.

Photograph 1: view from the corner of O'Connell and Albert Street.

Photograph 2: view of the site from O'Connell Street.

Photograph 3: view from the site from Albert Street.

Photograph 4: view of the site from O'Connell Street looking North.

EASEMENTS OR RESTRICTIONS

There are currently no easements impacting on the future potential for the redevelopment of the site.

TOPOGRAPHY AND VEGETATION

There are approximately 65 trees on the site. The most significant corridor of trees are located at the corner of O'Connell and Albert Streets. Consideration will be given to retaining any trees that are in good health as part of the future development scheme. The rezoning proposed does not turn on the trees located on the site, as the site is of such size and configuration that a detailed assessment and response can occur as part of the future application process.

The subject site is best described as relatively flat land with a mild slope from the east to the west with the lowest point of the site being within the south western corner.

The application is accompanied by a concept landscape plan, discussed further below.

EXISTING VEHICULAR ACCESS

The existing vehicle access is provided to the site from O'Connell and Albert Streets. Noting that the proposed development will close vehicle access from O'Connell Street to reduce traffic congestion and impact on O'Connell Street.

ARCHAEOLOGY

There are no known Items of Aboriginal Heritage located on the site and due to the site's development history, the land has been excavated for various previous developments, thus is highly altered from its natural condition. This has been confirmed by the Aboriginal Heritage Preliminary Impact Assessment.

Opportunities to salvage archaeological items unearthed during excavation works are to be considered. If any items are found during the excavation, in the first instance opportunities to salvage and reuse the items are to be incorporated. When this is not practical or possible, an interpretation strategy is to be prepared.

ACID SULFATE SOILS

The site is part Class 5 Acid Sulfate Soils as shown in the Parramatta LEP 2023. A preliminary site and soil assessment is to be conducted as part of the future development application.

SITE CONTEXT AND SITE ANALYSIS

The subject site is in a highly visible location at the northern part of the Parramatta CBD and is strategically located near key transport connections including O'Connell Street.

The site is currently unoccupied. The neighbourhood locality is currently one to two storey single houses on the eastern side of O'Connell Street and predominantly medium and high density housing on the western side of O'Connell Street. There is currently no mixed-use development in the immediate locality, and this proposed development will act as a catalyst for future growth within the North Parramatta Precinct.

The site being centrally located has excellent connectivity to all forms of transport. The new Parramatta light rail will be approximately 250m from the site and the rail about 1.7km from the site which connects to the T1, T2 and T5 trainlines. There is also the new Metro proposed to connect to Parramatta Station which will be closer to the site. The site has good access to various bus routes.

The site is proximate to numerous cultural and recreational facilities and opportunities such as Parramatta River, Parramatta female factory, Old Orchard Park, Parramatta Gaol and Prince Alfred Square. The following figures assist with site context and site analysis.

The site is located to the east of Parramatta River and Westmead Health and Education Precinct. A bus stop is located on the eastern site boundary on O'Connell

Street which provides a number of local and regional bus connections to the site. There is also the Parramatta ferry wharf that is 500m to the east of this site.

Figure 1: Site Aerial Context (DKO Architects)

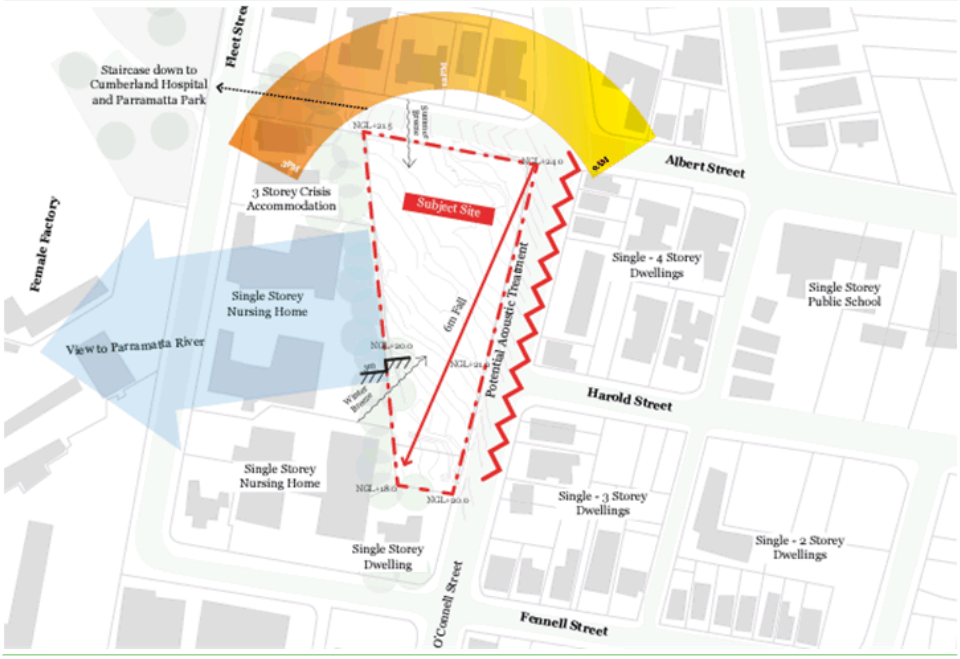
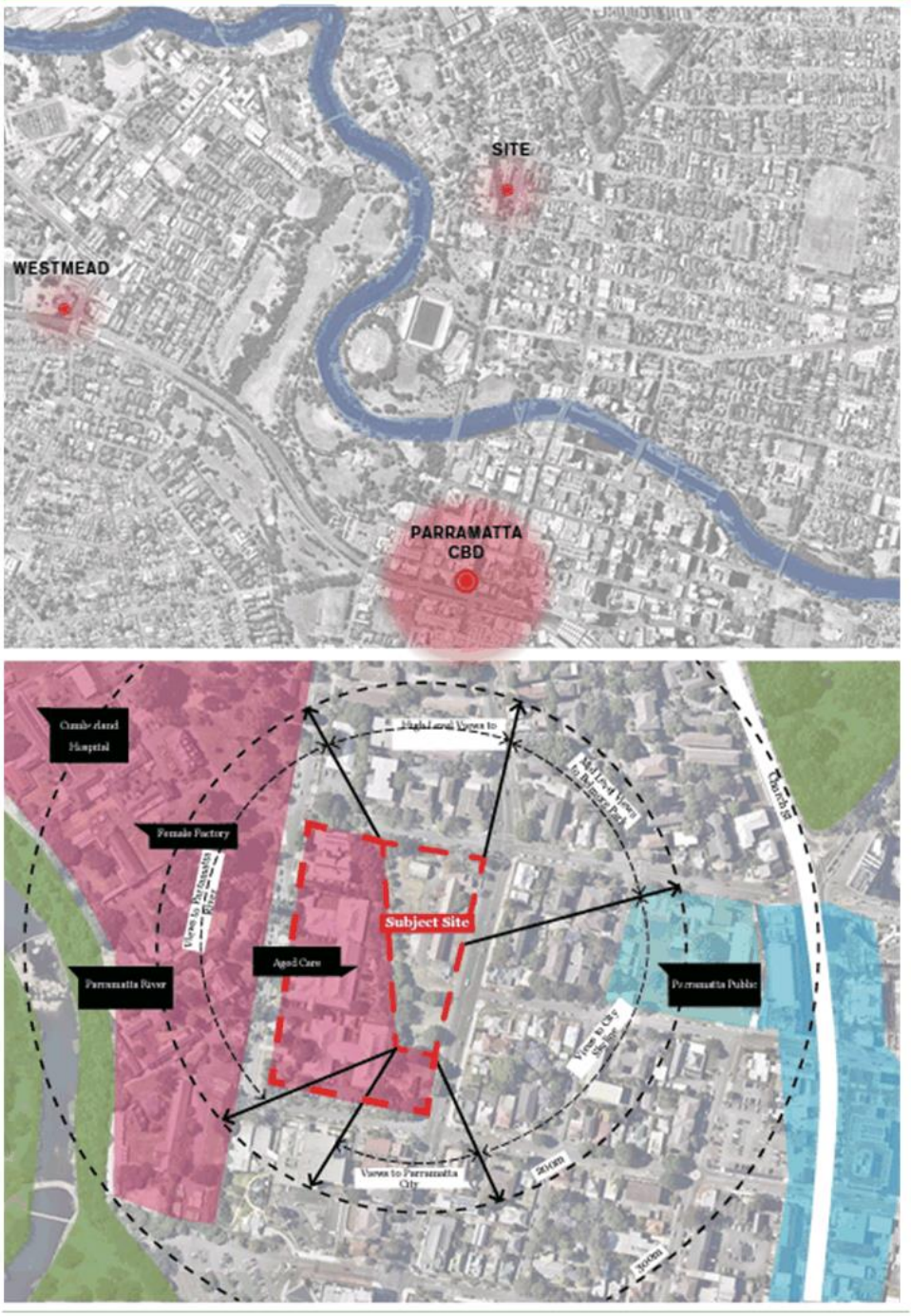


Figure 2: Broader Site Context (DKO)



CONTEXT IMAGES

As per photographs overleaf and subsequent pages, the following provides a series of images of the existing development surrounding the site.

Photograph 5: Shows the neighbouring building on Fennell Street. (Google Maps)

Photograph 6: Shows the recently renovated residential aged care home at 2 Fennel Street. (Google Maps)

Photograph 7: Existing aged care home at rear currently going through renovation on Fleet Street. (Google Maps)

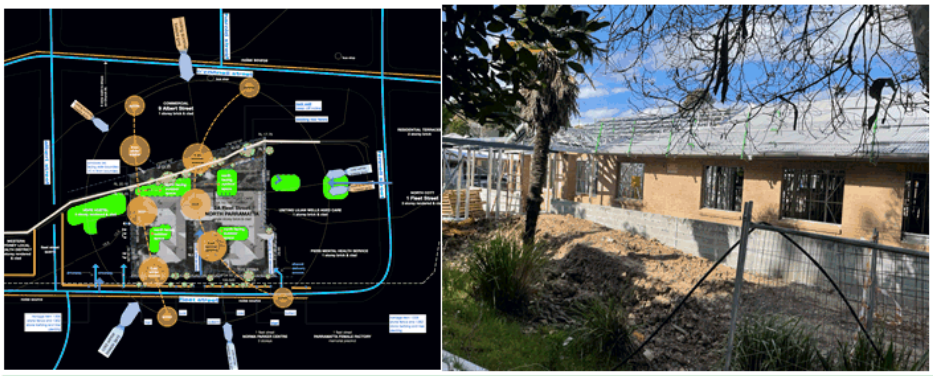
Photograph 8: Surrounding context, UNESCO World Heritage Listed Parramatta Female Factory Precinct at the rear (Google Maps)

PROXIMATE DEVELOPMENT ACTIVITY

A proper understanding of the Planning Proposal requires a clear appreciation of the adjoining development being undertaken, in particular 2A Fleet Street to the west of the site.

Southern Cross Care obtained consent for alterations and additions to their existing Aged Care facility, including the construction of two extensions. The Council granted approval in 2020 and the works are currently being finalised, as shown in the image below, taken on 13 September 2022 and an extract from the approved plans.

Figure 3: Extract of approved plans on neighbouring site 2A Fleet Street



It is submitted that this recent approval and construction is an important consideration in the assessment of the application.

The planning controls assume that the Southern Cross Care site redevelopment will be in the form of a tower of 66m in height as illustrated in the LEP and DCP extracts below.

Figure 4: Existing planning controls for neighbouring site

The indicative layout plan in the DCP illustrates that up to 3 towers of 66m in height would be constructed along the middle of the street block between Fennell Street and Albert Street. The Southern Cross Care site is being developed for 1-2 storey buildings and is not seeking to undertake the 2 towers of 66m shown for that land. This gives rise to the opportunity to develop a taller tower on the subject site, as was indicated early in the Parramatta North urban transformation precinct planning investigations. The Response to Submissions Report by Urban Growth in 2015 identified 2 towers of 20 and 30 storeys respectively on the subject site.

Figure 5: Existing DCP and figure from Urban Growth report

Parramatta DCP 2023

Urban Growth Response to Submissions Report 2015

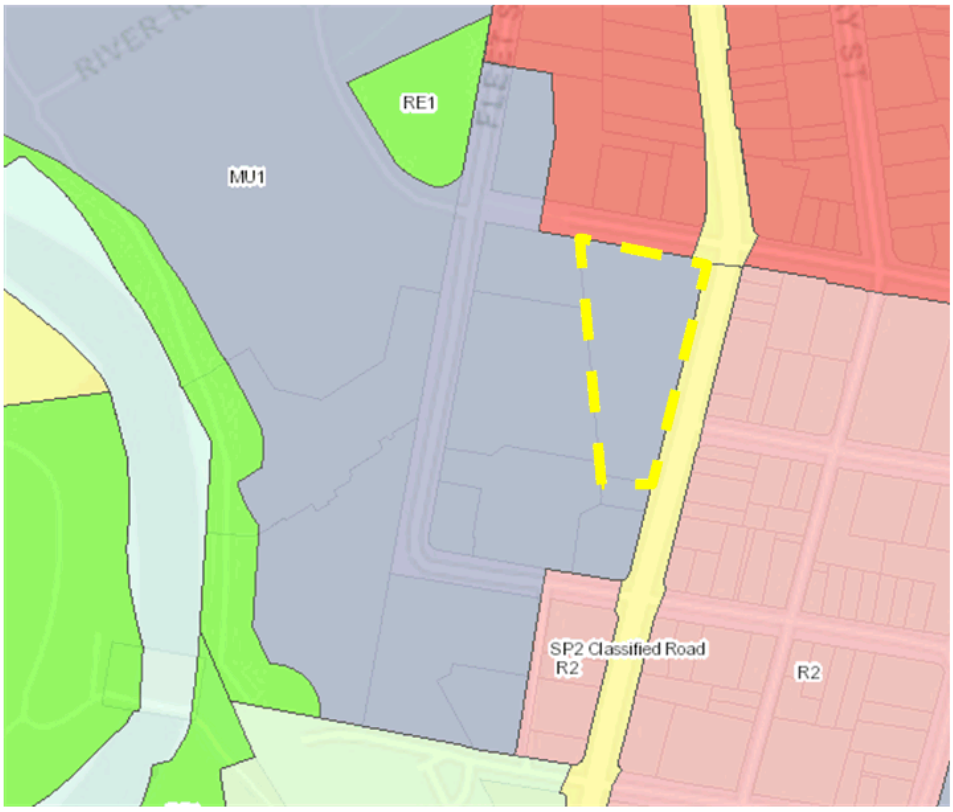
LOCAL PLANNING FRAMEWORK

The primary planning instrument applying to the subject site is *Parramatta Local Environmental Plan 2023.* This section identifies the key planning parameters within the LEP as they relate to the subject site.

ZONING

The land is zoned MU1 Mixed Use. No change to the zoning is proposed in by this planning proposal. An extract of the zoning map and land use table is provided below for context.

Figure 6: Extract from Parramatta LEP 2023 Land Zoning Map Sheet



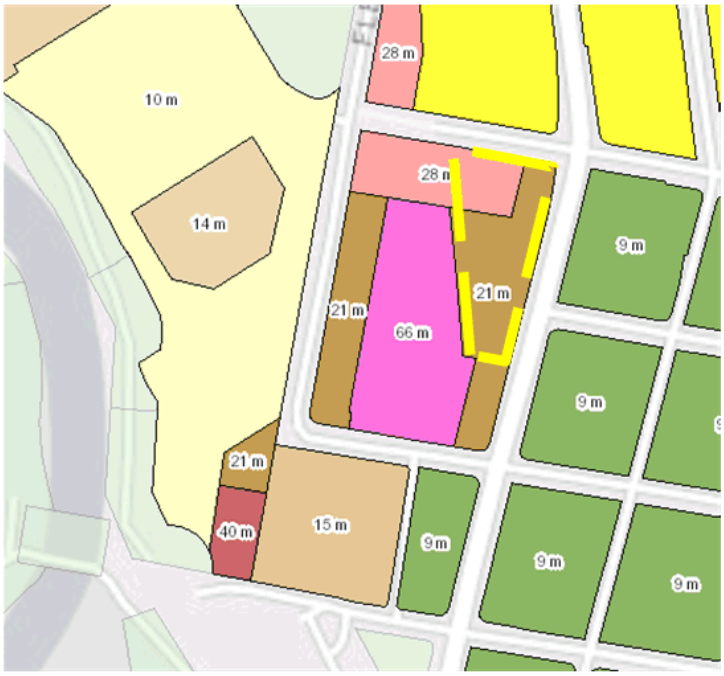
Subject Site

MU1 Mixed Use Zone	
1. *Objectives*	• *To encourage a diversity of business, retail, office and light industrial land uses that generate employment opportunities.* • *To ensure that new development provides diverse and active street frontages to attract pedestrian traffic and to contribute to vibrant, diverse and functional streets and public spaces.* • *To minimise conflict between land uses within this zone and land uses within adjoining zones.* • *To encourage business, retail, community and other non-residential land uses on the ground floor of buildings.* • *To create opportunities to improve the public domain and pedestrian links.* • *To protect and enhance the unique qualities and character of special character areas in Parramatta City Centre.*
2. *Permitted without consent*	*Home occupations*
3. *Permitted with consent*	*Amusement centres; Boarding houses; Building identification signs; Business identification signs; Car parks; Centre-based child care facilities; Commercial premises; Community facilities; Entertainment facilities; Function centres; Information and education facilities; Light industries; Local distribution premises; Medical centres; Oyster aquaculture; Passenger transport facilities; Places of public worship; Recreation areas; Recreation facilities (indoor); Registered clubs; Respite day care centres; Restricted premises; Shop top housing; Tank-based aquaculture; Tourist and visitor accommodation; Vehicle repair stations; Water recycling facilities; Any other development not specified in item 2 or 4*
4. *Prohibited*	*Agriculture; Air transport facilities; Airstrips; Animal boarding or training establishments; Boat building and repair facilities; Boat launching ramps; Boat sheds; Camping grounds; Caravan parks; Cemeteries; Charter and tourism boating facilities; Crematoria; Depots; Dual occupancies; Dwelling houses; Eco-tourist facilities; Electricity generating works; Exhibition homes; Exhibition villages; Extractive industries; Farm buildings; Forestry; Freight transport facilities; Heavy industrial storage establishments; Helipads; Highway service centres; Home occupations (sex services); Industrial retail outlets; Industrial training facilities; Industries; Jetties; Marinas; Mooring pens; Moorings; Mortuaries; Open cut mining; Port facilities; Recreation facilities (major); Research stations; Rural industries; Rural workers' dwellings; Secondary dwellings; Semi-detached dwellings; Sewerage systems; Sex services premises; Signage; Storage premises; Transport depots; Truck depots; Vehicle body repair workshops; Warehouse or distribution centres; Waste or resource management facilities; Water recreation structures; Water supply systems; Wharf or boating facilities; Wholesale supplies*

EXISTING BUILDING HEIGHT

The Height of Buildings Map for the Parramatta LEP 2023 indicates that the maximum building height permitted on the subject site is 21m and part 28m. Figure 7 in the below is an extract from the Height of Buildings Map for Parramatta LEP 2023.

Figure 7: Extract from Parramatta LEP 2023 Height of Buildings Map



Subject Site

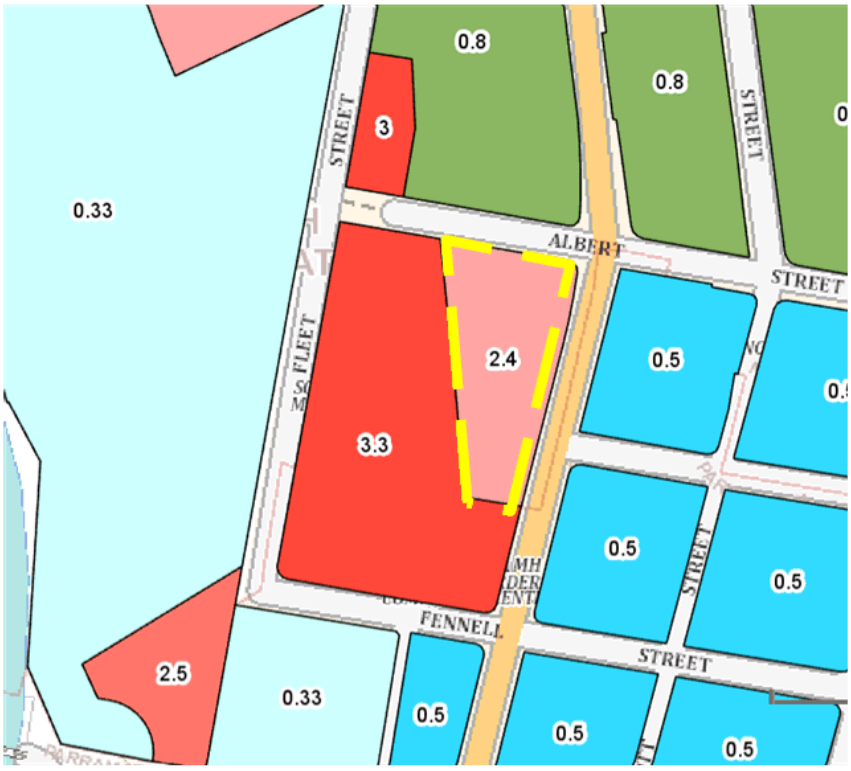
PROPOSED BUILDING HEIGHT

This Planning Proposal seeks to permit development with up to 78m (22 storeys) which is similar with the adjoining site, which has been redeveloped for a 1-2 storey aged care facility, rather than the indicated 2 towers.

EXISTING FLOOR SPACE RATIO

The current Floor Space Ratio Map for the Parramatta LEP 2023 indicates that the maximum floor space ratio for a building on the subject site 2.4:1 and 3.3:1. Figure 8 below is an extract from the Floor Space Ratio Map for Parramatta LEP 2023.

Figure 8: Extract from Parramatta LEP Floor Space Ratio Map



Subject Site

PROPOSED FLOOR SPACE RATIO

This Planning Proposal seeks to amend the maximum floor space ratio to 3.9:1.

HERITAGE

The subject site does not contain a heritage item listed under PLEP 2023. However, the site is in close proximity to a number of heritage items and conservation areas.

To the east of the subject site is Heritage Conservation Area, North Parramatta Conservation Area with several heritage items within. Following are the local items within the conservation area:

- Hollywood, 62 O'Connell Street, Parramatta
- Single storey residence, 72 O'Connell Street, Parramatta
- Dorislea, 74 O'Connell Street, Parramatta
- Residence, 76 O'Connell Street, Parramatta
- Single storey residence, 2 Fennell Street, Parramatta

To the west is:

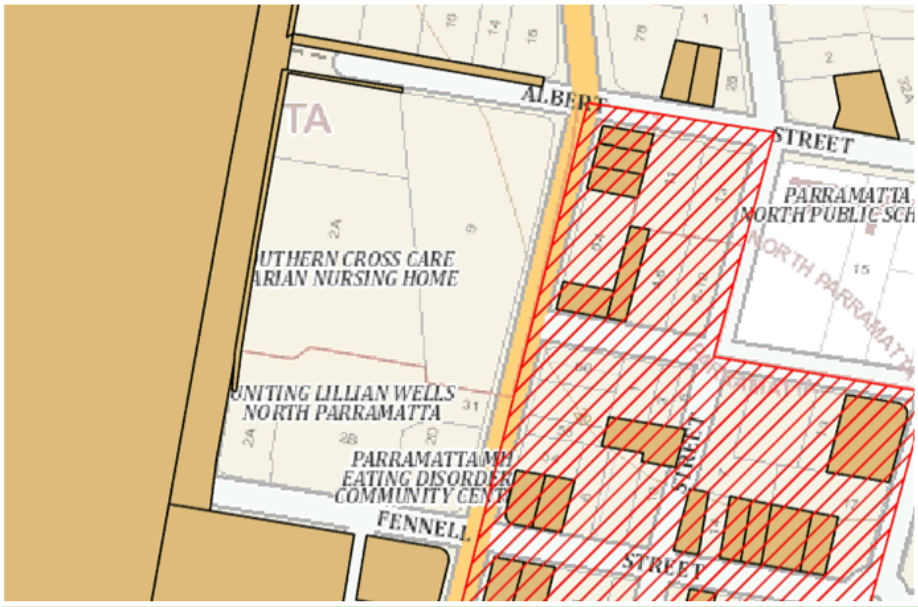
- Cumberland District Hospital (including Wisteria Gardens), 5A Fleet Street, North Parramatta; 1 Hainsworth Street, Westmead

To the north is:

- Stone kerb and gutter, Albert Street (west arm)

The subject site is located in close proximity to a number of heritage items; however, the proposal is not impacted by any known heritage constraints as demonstrated in the extract from the heritage map below.

Figure 9: Heritage Map Extract from Parramatta LEP 2023



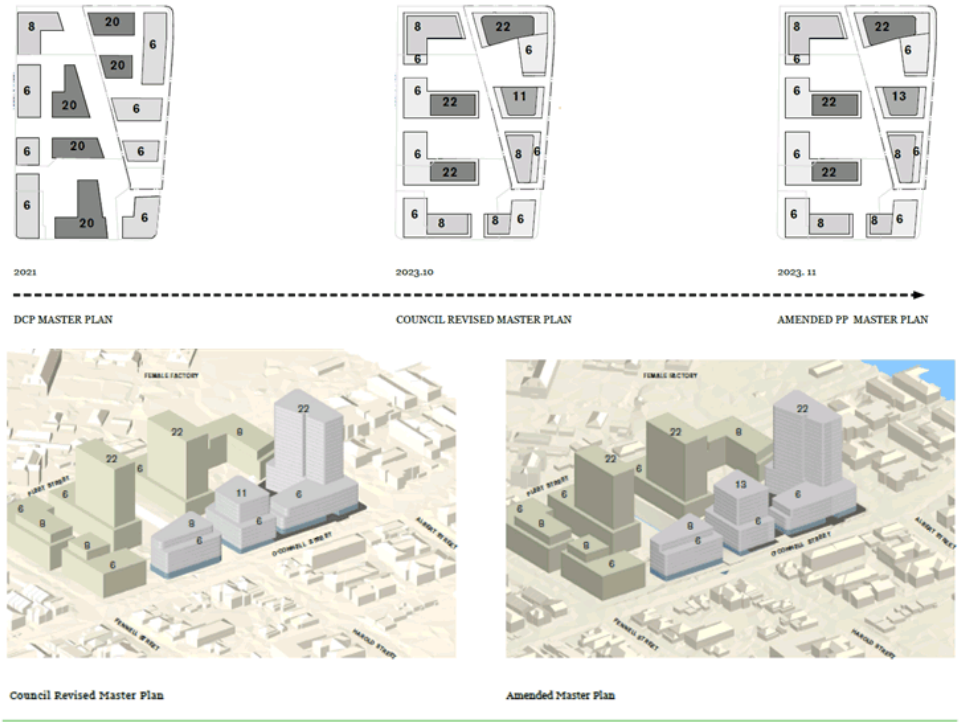
COUNCIL WORKSHOPS

During 2023 a series of ongoing design workshops were held between council and the applicant to discuss a satisfactory building form for the subject site.

This Planning Proposal is supported by a suite of technical studies, including detailed Urban Design analysis and testing by DKO.

Importantly, this work has been informed by the vision of Council as shown in Figure 9 below.

Figure 10: Alignment of urban design concept with Council's Masterplan (DKO)



TECHNICAL STUDIES

During 2023 a series of ongoing design workshops were held between council and the applicant to discuss a satisfactory building form for the subject site.

Key technical studies are addressed below, with all studies attached to this planning proposal.

URBAN DESIGN

The urban block within which the subject site is located in the locality of north Parramatta has not seen significant development activity in recent years. The proposed development aims to be a catalyst development for North Parramatta.

The subject site is in a prime public transport corridor where there is an extensive variety of sustainable transport options available, including, light rail, buses, walking and cycling. It is noted the locality has excellent connectivity with access to several key arterial road networks including O'Connell Street, Church Street, James Ruse Drive, Cumberland Highway and the M2 Motorway as well as regular public transport service.

Site Context

The merit of the proposed additional building height and density proposed in this planning proposal must be seen in the context of future vision of North Parramatta. The reference design provided with this submission comprises a podium and four towers ranging between 6 storeys and 22 storeys. The architectural design of the buildings appropriately responds to the surrounding heritage items and conservation in scale and design. This is demonstrated in Figure 10 on the next page.

Figure 11: Site Context and reference design (DKO)

Scale and Site Context

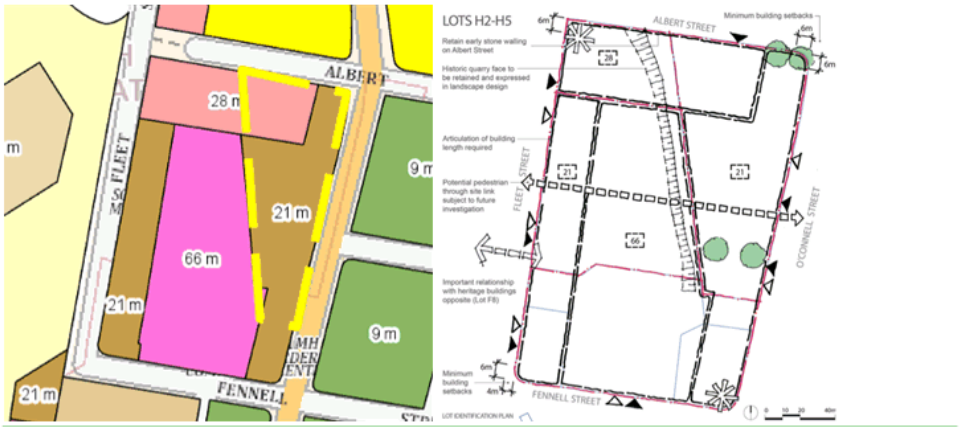
The proposal also seeks to align with the urban design principle explored as part of the Parramatta North Urban Transformation Strategy of stepping down the built form as the development approaches the heritage conservation area.

This approach has been supported by the Heritage Assessment noting "*Using lower forms along O'Connell Street is essential to managing scale transitions.*"

Importantly, the location of the greatest height is generally setback away from the eastern edge of the site. This is consistent with the framework implemented in the

Parramatta North Urban Transformation Strategy. That framework is imbedded in the height of building planning control and the DCP, as demonstrated in the below extracts from the LEP and DCP.

Figure 12: Existing planning controls for neighbouring site

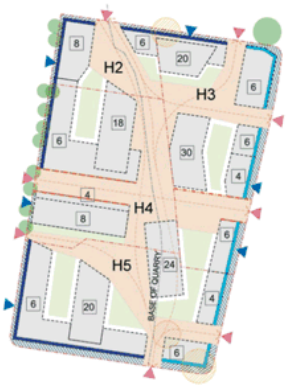


The indicative layout plan in the DCP illustrates that up to 3 towers of 66m in height would be constructed along the middle of the street block between Fennell Street and Albert Street.

As discussed earlier in this report, the planning controls assume that the Southern Cross Care site (immediately west of the subject site) will be redeveloped to include towers of 66m in height. However, the Southern Cross Care site is being developed for 1-2 storey buildings and is not seeking to undertake the towers of 66m shown for that land. This gives rise to the opportunity to develop a taller tower on the subject site, as was indicated early in the Parramatta North urban transformation precinct planning investigations. The Response to Submissions Report by Urban Growth in 2015 identified 2 towers of 20 and 30 storeys respectively on the subject site.

Figure 13: Existing DCP and figure from Urban Growth report

Parramatta DCP 2023



Urban Growth Response to Submissions Report 2015

The proposal to place height predominantly away from the east side of the subject site is consistent with the built form philosophy identified for the street block initially by Urban Growth and now imbedded in the Parramatta LEP 2023 for towers centrally located between Fleet Street and O'Connell Street. The planning proposal retains the intended transition to the east by stepping down the form along O'Connell Street, as was sought by the City of Parramatta Council through the PNUTS process. The scale of development permitted by the existing planning controls for the street block is clearly illustrated in the image below that also includes the proposed 78m tower for the subject site. It is clear that the intent of the PNUTS and Parramatta LEP planning controls is for the street block to contain built form of significant scale, that will deliver a mixed use outcome. This planning proposal is aligned with these planning controls and intended outcome for the street block.

Street Wall

The planning proposal provides a tower and podium building form with the height of the podium established by the future character of podiums which is proposed to be 6 storeys as shown in the Figure 13 below.

Figure 14: Street Wall Context (DKO)

Heritage advice has informed the initial concept images that breaks up the street wall to respond to the pattern of forms in the HCA along O'Connell Street to the east.

Building Separation

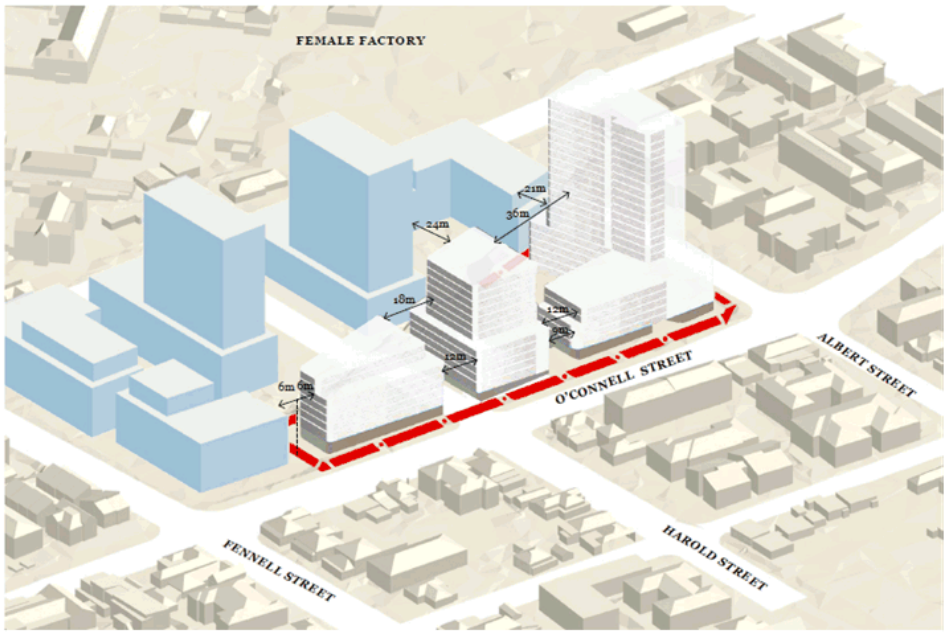
The proposal demonstrates that generous building setbacks and building separation can be achieved on the site with the four building forms. The generous separation is shown in figure 15 below.

Importantly, the number of buildings proposed for the site are reduced from that indicated in the DCP from 5 to a reduced form. The plan proposes for a reallocation of built form for a single point tower to the northern end of the site and an arrangement of buildings consisting of 8-13 storeys. This is a superior urban design response as the towers are better oriented than that shown in the DCP. Additionally, meeting the

adequate ADG separation and achieving privacy protection between the 5 buildings would be significantly challenging.

The form and layout have been rationalised by reducing the number of buildings from 5 and location has been carefully considered with respect to shadows and privacy protection.

Figure 15: Building Separation (DKO)



Shadow analysis

A detailed shadow impact assessment is included within the urban design study. This shadow impact assessment has considered both the existing and future development context. Shadow diagrams are provided between 9 am and 3 pm on 21 June and confirm that:

- There is no detrimental impacts on the heritage buildings and conservation area along O'Connell Street.
- There is no detrimental impacts on neighbouring buildings (existing and developed).
- The concept achieves the minimum sunlight access requirements to communal open space as required by the ADG.

Refer to Urban Design Study for detailed shadow assessment.

VISUAL IMPACT ASSESSMENT

A visual impact assessment is included within the urban design study.

This assessment takes into account views to and from heritage items and precincts. Refer to attached urban design study for details, showing the exceptional design response to the character of the precinct and how the proposal makes a positive contribution to its setting.

WIND IMPACT ASSESSMENT

Windtech have prepared a wind impact assessment report for the concept plan submitted with this planning proposal. This testing has concluded that a future development can achieve compliance with relevant wind impact criteria for safety and comfort. Recommendations within the wind impact assessment report can be incorporated into a future development proposal over the subject site.

RETAIL NEEDS ASSESSMENT

MacroPlan have provided a retail needs assessment for the planning proposal. The following conclusions were made:

- *The trade area population is estimated at 1,770 at mid-2021, and is forecast to reach 3,570 people by 2036, reflecting average annual growth of 1.6% per annum to 2026, 9.5% from 2026 to 2031, and 3.4% from 2031 to 2036.*
- *The trade area population is generally characterised by slightly younger, overseas born families.*
- *Total retail expenditure per household, estimated at $31,745 per annum, is 28.4% below the Greater Sydney average. Within this, spend on food and non-food are 24.2% and 34.2% below the respective averages.*
- *Up to 680 sq.m of retail specialty is supportable at the subject site in 2031, along with supporting non-retail shop provision and a childcare centre. The current planned tenancies all fall within the supportable floorspace estimations.*
- *The estimated trading impacts arising from the development of the planned retail provision at the subject site on other retailers in the surrounding area are projected to be minor/moderate and are unlikely to threaten their viability.*

The provision of floorspace provision is therefore appropriate.

TRAFFIC AND PARKING ASSESSMENT

The subject land achieves optimal access to pedestrian pathways, cycleways as well as rail. Both the Parramatta Light Rail, bus services and cycleways will deliver truly city shaping infrastructure which will powerfully change the way people live within Parramatta and commute to Parramatta. This will result in a significant lower reliance on private vehicle trips.

In addition, the draft Bike Plan supports the City of Parramatta's Vision to be Sydney's Central City, sustainable, liveable, and productive city. The plan seeks to brings forward the planned and coordinated delivery of cycleway infrastructure to promote multi-modal transport options throughout the locality.

The traffic and transport assessment report outlines that the proposed scheme will be able to accommodate sufficient carparking spaces.

The traffic impacts assessment concludes that "*the subject planning proposal is supportable on traffic planning grounds*". Noting that the proposed amendments to height and FSR will not result in detrimental traffic impacts and existing road networks has capacity to accommodate increased traffic.

ABORIGINAL HERITAGE IMPACT ASSESSMENT

Extent Heritage have prepared an Aboriginal Heritage Impact Assessment for the subject site. Relevant extracts are provided below, noting that no further consideration is necessary as part of this Planning Proposal.

4. Conclusions

No Aboriginal objects or places as defined by the National Parks and Wildlife Act 1974 are located within the study area. Therefore, an Aboriginal Heritage Impact Permit approval is not currently required for the proposed works. There are currently no places within the subject land included on the National, Commonwealth or World lists under the EPBC Act. There are no known Declarations under the ATSIHPA in relation to the subject land. No Commonwealth heritage approvals are currently required with respect to Aboriginal heritage. With reference to the risk management process set out in the Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW (DECCW, 2010), we note:

- *There are no AHIMS sites recorded within the proposed works area,*
- *A small portion of the south-western corner of the study area is located within 200m of a former first-order watercourse. However, the results of the desktop assessment and visual inspection does not indicate that there are (or are likely to be) Aboriginal objects within the study area.*

Geotechnical information available for the study area does not indicate the show a sand body or extensive topsoils to be present and it is considered unlikely for the Parramatta Sand Body and associated Aboriginal objects to be present.

4.1 Assessment of potential impact to Aboriginal heritage

The proposed development of the study area involves the construction of four main building structures with an underground basement level for carparking. It is assumed that the size of the development, and the associated basement level, has been determined with regard to the relevant planning requirements and commercial considerations, and that excavation cannot be avoided. As there are no previously recorded Aboriginal objects within the study area and the assessment has concluded it is unlikely to contain Aboriginal objects, the project is consequently not considered likely to result in any harm to Aboriginal objects and would not require an AHIP in order to proceed.

While the process set out in the Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW DECCW 2010 indicates 'proceed with caution' for the proposed works, there is always some risk that unexpected Aboriginal cultural deposits or skeletal remains may be encountered during development works, including in areas such as the current study area that has been disturbed by prior earthworks.

EUROPEAN HERITAGE IMPACT ASSESSMENT

Paul Davies Pty Ltd has provided an European Heritage Impact Assessment for the subject site. It is noted that the subject is not identified as containing European heritage under the Parramatta LEP heritage map.

To the east of the subject site is Heritage Conservation Area, North Parramatta Conservation Area with several heritage items within. Following are the local items within the conservation area

- Hollywood, 62 O'Connell Street, Parramatta
- Single storey residence, 72 O'Connell Street, Parramatta
- Dorislea, 74 O'Connell Street, Parramatta
- Residence, 76 O'Connell Street, Parramatta
- Single storey residence, 2 Fennell Street, Parramatta

To its western boundary there is

- Cumberland District Hospital (including Wisteria Gardens), 5A Fleet Street, North Parramatta; 1 Hainsworth Street, Westmead

To its northern boundary there is

- Stone kerb and gutter, Albert Street (west arm)

The Heritage Impact Assessment has considered in detail the heritage attributes of the broader area, along with the relationship and potential impacts of the proposed concept submitted with this planning proposal. In this regard, the Heritage Impact Assessment has concluded in part the following:

> *While the term design excellence is widely used and not always understood, on this site the testing of design options through design excellence provides a contextual approach to design. The urban study focuses on the setting around the site as a starting point to develop forms, open space and massing. This is conceptually sound and can be further developed through a detailed design process to achieve a high-quality urban outcome for the site and area.*
>
> *The initial reference scheme responded to the controls that were in place and to the context of the area. The revised scheme, with a much more nuanced set of site controls allows a significantly better contextual outcome particularly with regard to heritage matters. For a large up-scaling of development on the site, the reference scheme provides a well-balanced and responsive approach to heritage relationships and context.*

This assessment therefore confirms the merit of the proposed concept over the subject site, with it having a positive contribution to nearby heritage items and conservation areas.

ARBORICULTURAL IMPACT ASSESSMENT

The subject site contains vegetation mostly located along the site boundaries. The Arboricultural Impact Assessment has been prepared as part of this planning proposal. Trees identified as having retention values are along Albert Street boundary and the southern boundary which will be retained and incorporated in future architectural design. The proposed amendment to height control will not result in any adverse impacts on the biodiversity within the site.

DRAINAGE AND FLOODING

The site is not within the 1 in 100 year Average Recurrence Interval and is not within the Probable Maximum Flood (PMF) area.

The flood assessment attached with this proposal confirms that the additional height and FSR for the proposed development will not impose any additional risks to future residents and neighbouring properties. The assessment specifies "*it will cause no loss in flood storage or water diversion up to the PMF storm event*".

Therefore future development can comply with Council's flood planning requirement.

NOISE IMPACT ASSESSMENT

Attached as part of this proposal is a Noise impact assessment which has reviewed the proposed building envelope and the potential noise emission from the use of the site. The report concludes that a future development can successfully mitigate noise impacts from mechanical plant and also the future child care centre. Likewise, the report noted that the future development will not be subject to impacts associated with vehicles using O'Connell Street.

Future development can therefore be:

> *Based on the acoustic assessment of the proposed development to the proposed residential provided will be acidotically acceptable*

SOCIAL IMPACT ASSESSMENT

A social impact assessment has been undertaken for the planning proposal and is separately attached.

Conclusion

As described through the several specialist report, the proposed amendments to height and FSR will not result in adverse impacts.

PLANNING PROPOSAL

The required content of a planning proposal is set out in Section 3.33 of The Environmental Planning and Assessment Act 1979. To assist with the preparation of a planning proposal, the DPE have published the Local Environmental Plan Making Guideline (August 2023) which sets out the form and content that is required within the six parts identified below:

- ***Part 1 – Objectives and intended outcomes -***

  a statement of the objectives of the proposed instrument

- ***Part 2 –Explanation of provisions –***

  an explanation of the provisions that are to be included in the proposed instrument

- ***Part 3 – Justification of strategic and site specific merit –***

  justification of strategic and potential site-specific merit, outcomes, and the process for implementation

- ***Part 4 - Maps –***

- *existing and proposed maps, where relevant, to identify the effect of the planning proposal and the area to which it applies*

- ***Part 5 – Community consultation –***

  details of consultation undertaken with Government agencies, council or other authorities, and community consultation that is to be undertaken on the planning proposal post Gateway and during exhibition

- ***Part 6 – Project timeline –***

  Project timeline to detail the anticipated timeframe for the LEP making process in accordance with the benchmarks in this guideline.

This Planning Proposal has been prepared in a manner consistent with the LEP Plan Making Guidelines, including the specific matters required to be addressed and also the anticipated timeframe.

PART 1 – OBJECTIVES OR INTENDED OUTCOMES

The objective of the Planning Proposal is to amend Parramatta LEP 2023 to:

To provide suitable building height and floor space ratio which will facilitate urban renewal of the subject site along with the provision of high-density development commensurate with State Government planning strategies. The Planning Proposal seeks to provide for a diversity of new housing within an ideal strategic location.

The intended outcome of the planning proposal is to:

- Contribute to the site's role within Parramatta CBD as a strategic centre that provides housing, jobs and services.
- Contribute to the rejuvenation of the Northern Foreshore Precinct by encouraging supporting development activity within a mixed-use scenario that is afforded the scenic surrounds of the Parramatta River.
- Contribute to housing diversity and choice within the City of Parramatta

Deliver quality housing within the City of Parramatta that is sustainable, and with high amenity values.

PART 2 – EXPLANATION OF PROVISIONS

Part 2 of the Planning Proposal provides an explanation of the provisions that are to be included within the Planning Proposal. It includes a written explanation that is supported by mapping where relevant.

The stated objectives and intended outcomes at the subject site, the following maps of Parramatta LEP 2023 will be amended:

- Amending the Height of Building Map for Parramatta LEP 2023 to permit development with a maximum building height of 78m (22 storeys).
- Amending the Floor Space Ratio Map for Parramatta LEP 2023 to permit a maximum FSR of 3.9:1.

DKO Architects have undertaken detailed urban design analysis and architectural concept testing for the subject site. This submission supports proposed changes to the planning controls for the subject site located at 31 O'Connell Street and 9 Albert Street, North Parramatta.

Recommended uplift and new planning controls for this site would facilitate opportunities for high quality urban design outcomes and orderly and economic development to support the 30-minute city and local housing demand.

PART 3 – JUSTIFICATION OF STRATEGIC AND SITE-SPECIFIC MERIT

The strategic merit test is demonstrated through a series of established questions set out in turn below.

However, before dealing with these questions it is relevant to clarify the current investigations being undertaken by the Department of Planning Infrastructure and Environment in relation to Parramatta CBD.

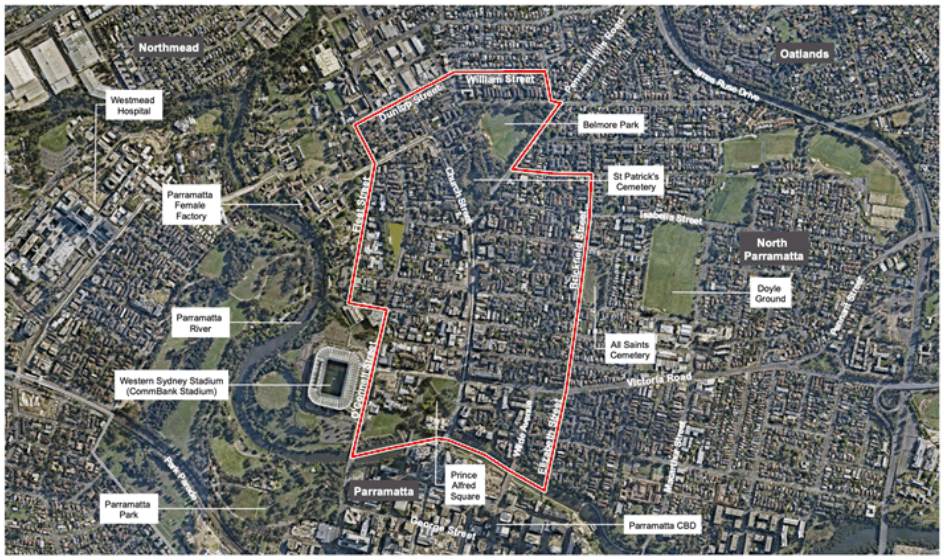
The current planning controls for the site and surrounding North Parramatta Urban Transformation (PNUT) Precinct arose out of detailed study initiated by Urban Growth NSW and that led to a State Environmental Planning Policy. The controls are now imbedded in the Parramatta LEP 2023, supported by site specific guidelines in the Parramatta DCP.

Arising from the deferral of land north of Parramatta River from the Parramatta CBD Planning Proposal in 2022, the Department initiated a "North Parramatta Place Strategy". The Department notes –

> *North Parramatta is located close to the fast-growing Parramatta CBD. Together with City of Parramatta Council, local residents, community organisations and businesses, the Department of Planning and Environment will create a North Parramatta Place Strategy for this important area.*
>
> *The Place Strategy will deliver a vision for the future of North Parramatta that will meet the needs of a growing and changing population, enhancing liveability for all. It will guide future growth in a way that recognises and responds to the heritage significance of the area.*
>
> *Developing a Place Strategy will provide the opportunity to understand what's important in North Parramatta, what aspects should be preserved and how the area can evolve to meet the needs of people who live, work and play in North Parramatta.*

The subject site is within the Place Strategy area, as shown on the map extract below (site indicated).

Figure 16: North Parramatta Place Strategy (Source: City of Parramatta)



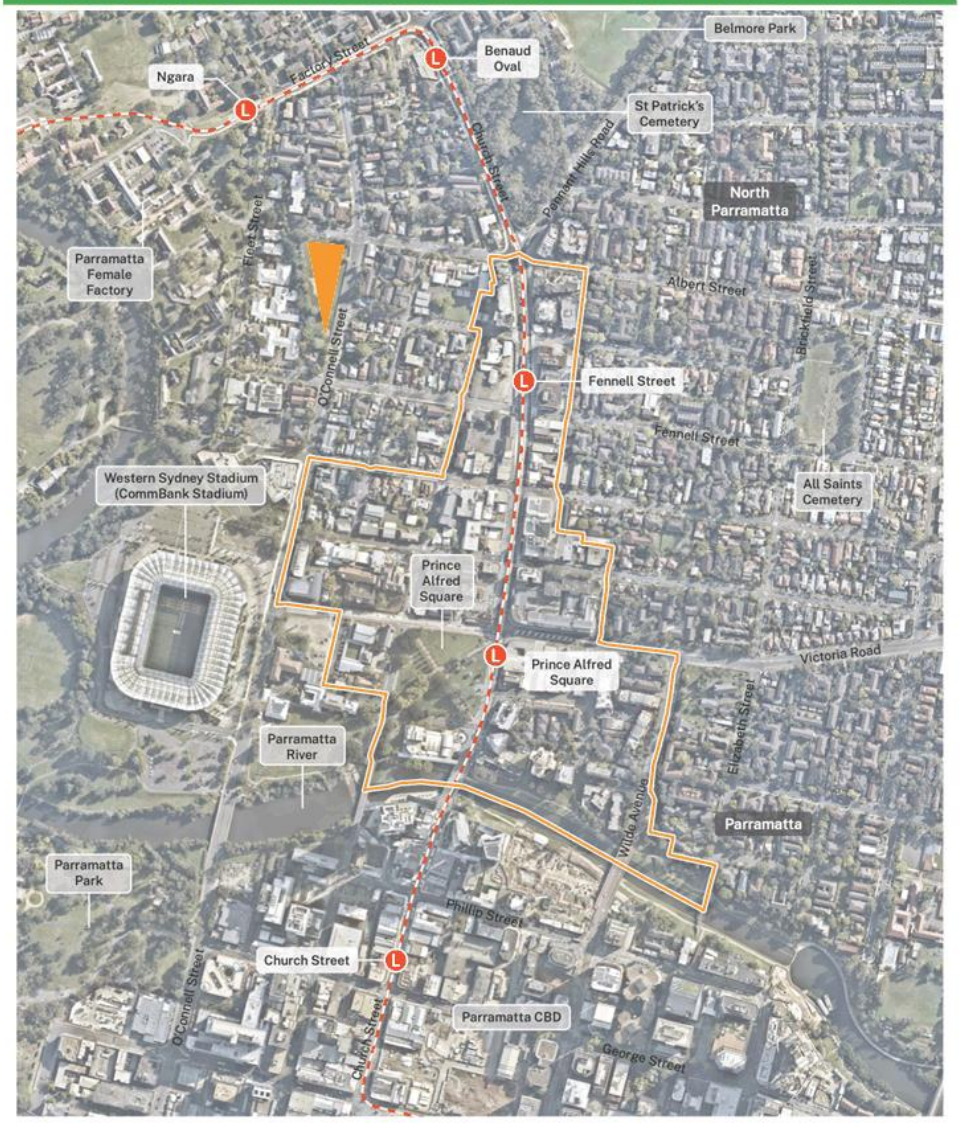
On 2nd December 2022 Think Planners attended the first Community Visioning Workshop. It was apparent that despite the boundaries of the Place Strategy including the site, the strategy is not seeking proposing to revisit or alter the current planning controls appliable to the site and surrounds.

In November 2023 the Minns State Government announced that progressing the strategy would not eventuate. Rather, an announcement was made by the NSW Government that the Church Street North Precinct will be rezoned via a state-led process through the making of a State Environmental Planning Policy.

The area to benefit from the SEPP process has been articulated in a map as seen in Figure 17.

This announcement provides clarity that the site that is the subject of this planning proposal is not included in the boundaries of the Church Street North rezoning. Nothing arises in these changes to policy that prevents the proper assessment of this application.

Figure 17: Church Street North State-Led Rezoning (Source: NSW Government)



As the subject site is not located within the North Parramatta Place Strategy and the state-led rezoning area, the subject site is within the area of Parramatta Council's interest. As noted in the council's report titled "*Parramatta CBD Planning Frame-work – Planning Investigation Areas*"

> *"The Government's decision to discontinue the preparation of the North Parramatta Place Strategy and instead focus on the area previously part of the Parramatta CBD Planning Proposal (within the grey hatched boundary) means there is no longer a policy overlap with the original PIA boundaries*
>
> *"Council is now in a clear position to make recommendations about the progression of the strategic planning work to review planning controls within the PIAs."*

Accordingly, the North Parramatta Place Strategy and the state-led rezoning has no bearing or constraint upon the ability of the Council to assess this Planning Proposal. This planning proposal is an early mover within the precinct in investigating and reviewing of the planning controls.

Importantly, the planning proposal is consistent with the vision for the street block in which the site is located. The vision, as manifested in the planning controls, is for high density development of a series of tower forms running down the centre of the block, that transitions at the edges to a lower high density form.

The strategic merit test is demonstrated thorough a series of established questions set out in turn below.

SECTION A – NEED FOR THE PLANNING PROPOSAL

1. Is the planning proposal a result of an endorsed LSPS, strategic study or report?

Yes.

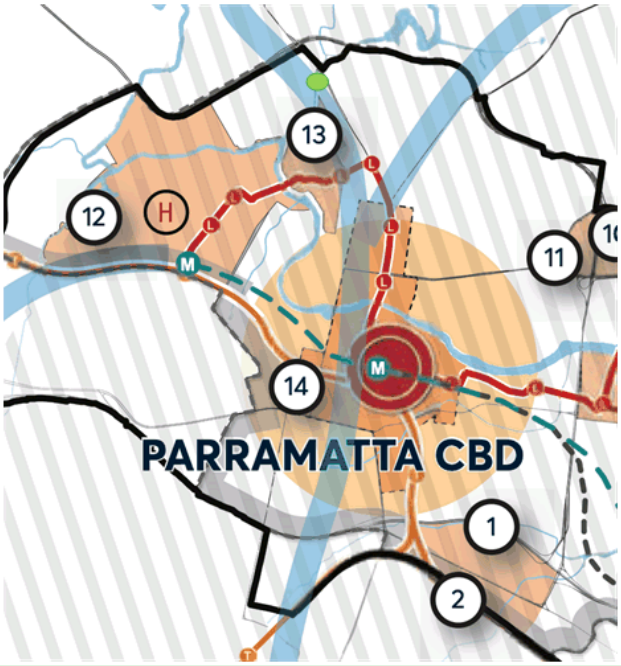
Parramatta Local Strategic Planning Statement

The Parramatta Local Strategic Planning Statement came into effect on 31 March 2020 and this document sets out the 20-year vision for land use planning for the City of Parramatta. The LSPS contains 16 planning priorities under 4 key themes which are:

- Local planning priorities.
- Livability planning priorities.
- Productivity planning priorities.
- Sustainability planning priorities

As illustrated in the extract from the LSPS below, the subject site is nominated as being within a "Growth Precinct".

Figure 18: Growth precinct map (Source: City of Parramatta 2020)



The planning principles relevant to the proposal are addressed below.

1. Expand Parramatta's economic role as the Central City of Greater Sydney.

The proposal aligns with the policy direction to promote diverse and active uses at the street level of buildings in the MU1 Mixed Use business zones within Growth Precincts and Local Centres to create lively neighbourhoods with interest and vitality. The amendments will enable a delivery of specialised retailing within the Precinct.

3. Advocate for improved public transport connectivity to Parramatta CBD from the surrounding district

The proposal aligns with the policy direction to stage planning proposals and redevelopment to coincide with the delivery of public transport. In this regard the timing of this planning proposal aligns with the committed and substantially constructed Parramatta Light Rail Stage 1.

4. Focus housing and employment growth in the GPOP and Strategic Centres; as well as stage housing release consistent with the Parramatta LSPS

The proposal aligns with the policy direction to deliver housing on the subject site, as identified on the structure plan map.

7. Provide for a diversity of housing types and sizes to meet community needs into the future

Council policy direction 24 which falls within this priority is relevant to the proposal and is addressed below.

> *P24 Provide for a range of housing types and sizes that cater to the Parramatta community to ensure housing diversity consistent with the City of Parramatta Local Housing Strategy (once endorsed by Council and DPE).*

As per the findings of the Parramatta Local Housing Strategy, by 2036, the population of the City of Parramatta LGA is anticipated to increase by over 175,000 people to a total of over 416,000 people and is expected to need an additional 77,000 dwellings to accommodate this population growth. The LHS notes that the investigation outcomes of this Strategy indicate that the population is likely to increase even more substantially.

The proposal will allow for the construction of approximately 370 new residential units, supporting the housing needs of the locality as identified by the LHS.

Parramatta North Urban Transformation (PNUT)

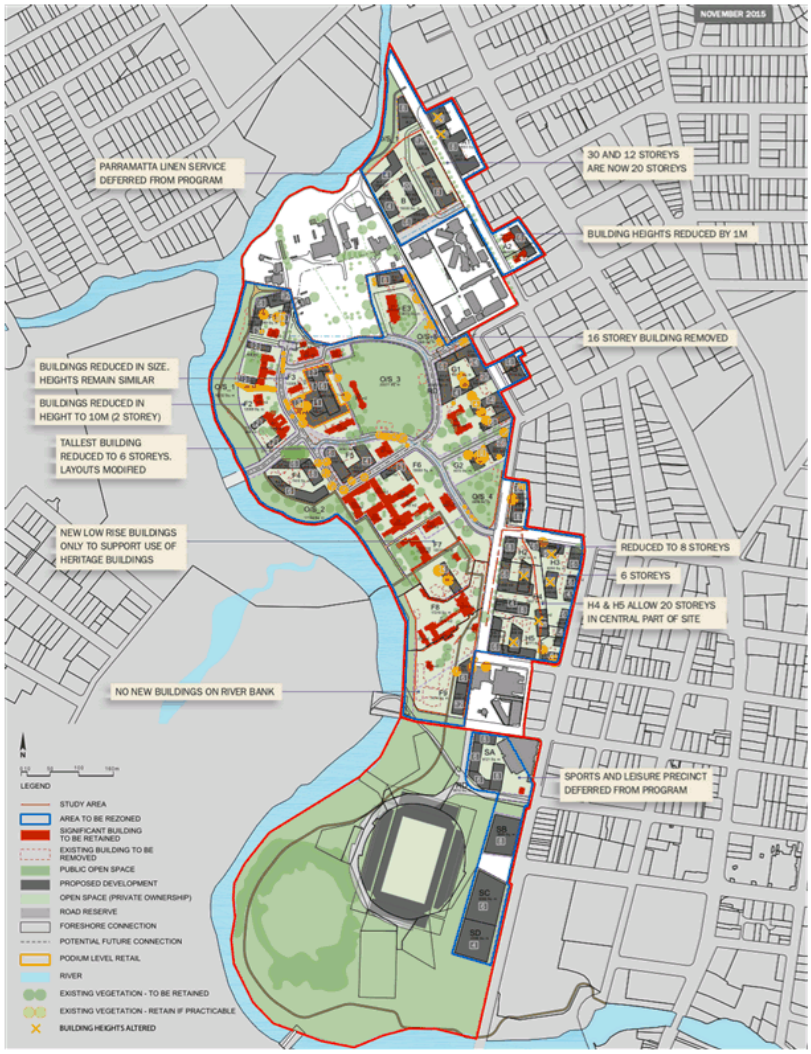
The current planning controls for the site and surrounding North Parramatta Urban Transformation (PNUT) Precinct arose out of a State Environmental Planning Policy, that was initiated by Urban Growth NSW for the precinct.

The site-specific merits of the subject site and surrounding lands led to amended controls for the precinct.

The PNUT Precinct is a mixed-use renewal precinct located adjacent to the Parramatta CBD. PNUT contains areas of unique heritage, landscaped spaces, and river settings. It is noted that the eastern edge of the precinct contains the core, a vibrant neighbourhood centre with a range of retail, commercial and residential uses serving existing and new local communities.

The site is within the “Parramatta North Urban Transformation” area. Urban Growth, acting in its capacity as the NSW Governments urban transformation delivery organisation, prepared a development proposal for the Parramatta North Precinct. The Precinct is illustrated in the extract below. The planning controls were made via a SEPP in 2015.

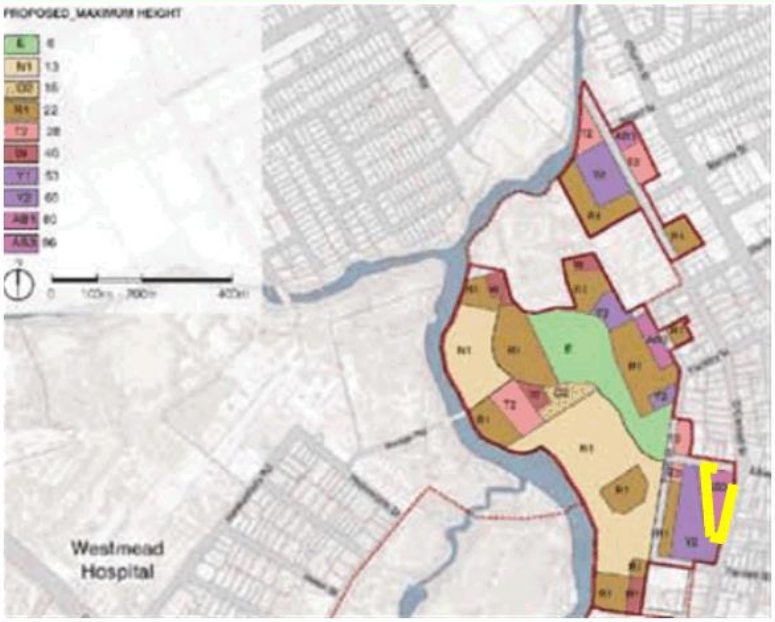
Figure 19: Parramatta North Urban Transformation Strategy



The Parramatta North Urban Renewal proposed plans have been developed through careful consideration with various stakeholders and with state and local governments. The plans identified that with increased funding within North Parramatta especially in public transport it is essential in identifying areas for urban renewal. The below figures are taken from Parramatta North Urban Renewal Summary Sheet prepared by Allen Jack + Cottier Architects.

Maximum building height of 96m

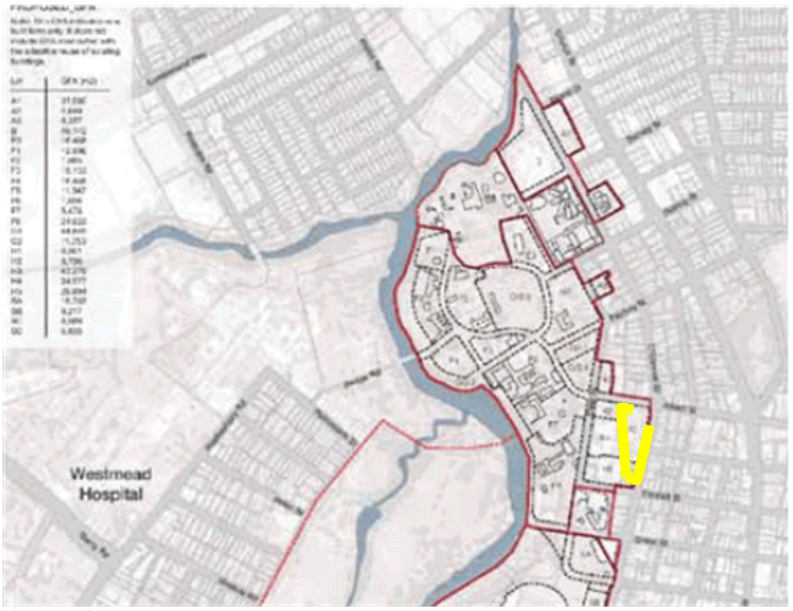
Figure 20: Maximum Building Height Parramatta North Urban Renewal Strategy



Subject Site

With a maximum Gross Floor Area (GFA) replacing the typical FSR Control, the proposed maximum GFA for this site was 43,279m^2 under the proposed Paramatta North Urban Renewal Strategy .

Figure 21: Maximum GFA Parramatta North Urban Renewal Strategy



Subject Site

The planning proposal has taken into consideration the following principles of the PNUT study.

- Concentrating height in the eastern part of the PNUT Precinct and
- providing an appropriate scale of development along O'Connell Street.

In this regard the planning proposal seeks a modest increase to the height along O'Connell Street to permit 6 storey street wall buildings and the reinstatement of the tower building on the north western edge of the site that is similar to the proposed by Urban Growth.

The below figure, taken from the Response to Submissions Report (9 June 2015) illustrates that the subject site had been identified by Urban Growth as suitable for 5 buildings in total with heights of up to 20 and 30 storeys. Subsequent to further review, including consultation with City of Parramatta Council, the Minister made the plan with the height and FSR controls currently within the PLEP2023.

Figure 22: Response to Submission Report (Source: SJB)

Figure 4.3.5.20 – Development lots H1 to H5

However, after a review of detailed urban design and architectural plans of the H3 site scheme, it is clear that there is a better outcome achievable on the site, which does not seek the 30 storey tower from proposed by Urban Growth, nor the compact tight 5 building from what was finally gazetted. The proposal suggest that the most appropriate form is to comprise of three forms, well spaced, well oriented and reaching up to 22 storeys in height (corresponding with tower heights on adjoining land). The building form is illustrated in the extract from the DKO pack below.

The proposed scheme leverages from the established site specific merits and proposes improvements to the previous work that will result in a better built form and urban design outcome to that enshrined in the LEP and DCP.

The proposal will deliver better built form outcomes through improvements to separation, overshadowing and orientation. The proposal will be an "early mover" in delivering upon the aspirations for the mixed use precinct by delivering retail and commercial activity that is lacking in the precinct. The proposal will deliver quality public domain, a high standard of urban design, creation of integrated community, and at the same time respond to its context through the transition of built from east of the site to west of the site.

This proposal is a result of the previously explored Parramatta North Urban Transformation strategy and is aligned with the broader strategic planning framework for Parramatta.

2 Is the planning proposal the best means of achieving the objectives or intended outcomes, or is there a better way?

YES

It is considered that the Planning Proposal is the best means of achieving the stated objective of urban revitalisation of this land.

The Planning Proposal is undoubtedly the most efficient mechanism available for stimulating urban renewal and accelerating the delivery of high-density housing in a manner consistent with the strategic directions established in the documents, including A Metropolis of Three Cities – Greater Sydney Region Plan, the Central City District Plan, the Greater Parramatta and Olympic Peninsular Plan, the CBD Planning Proposal and the Parramatta CBD Strategy.

Other options considered include:

a) Formal submission to a principal LEP

   Parramatta LEP 2023 is a recently made principal LEP, with its review at least five years away. This pathway is, accordingly, not open.

b) Submission on a Council Planning Proposal for North Parramatta

   The Council is not including this area in its Planning Investigation Areas that are proposed for future studies. This pathway is accordingly not open.

c) North Parramatta Place Strategy

   In light of the recent announcement the North Parramatta Place Strategy has been replaced by a state led rezoning, Church Street North area. The subject site is not included as part of the Church Street North area and hence this pathway is not open.

d) Cl.4.6 Variation

   The additional height and FSR proposed are not due to the proposal being unable to comply due to site constraints. In addition, food and drink premises are prohibited within the zone, meaning an alternative mechanism is required.

This site-specific planning proposal allows the proponent to provide detailed urban design and site-specific investigations to support the requested changes in height and

FSR. It will allow for the site to be contemplated in detail, particularly regarding its urban form, response to constraints like flooding, and integration with broader State and local strategic plans and priorities. Accordingly, the planning proposal is the most suitable means of achieving the objectives and intended outcomes for the site.

The Planning Proposal is the most efficient mechanism for stimulating urban renewal and accelerating the delivery of high-density housing.

SECTION B – RELATIONSHIOP TO THE STRATEGIC PLANNING FRAMEWORK

3. Will the planning proposal give effect to the objectives and actions of the applicable regional or district plan or strategy (including any exhibited draft plans or strategies)?

Yes

The relevant strategic plans for consideration include the Metropolis of Three Cities – Greater Sydney Region Plan 2018 and the Central City District Plan 2018.

The DPE Gateway determination report makes the following commentary under the heading "Strategic Merit Test" and it is particularly noted that the comment is in relation to all land under consideration (it does not exclude the Northern Foreshore Precinct)

> *The site is within the Central City District and the former Greater Sydney Commission (GSC) released the Central City District Plan on 18 March 2018.*
>
> *The District Plan commits to additional housing supply with access to jobs and services (Planning Priority C5) through a 21,650 five-year housing supply target for the Parramatta LGA, but this housing growth is intended to be supported by liveability, productivity and sustainability outcomes. The structure plan for the Central City District demonstrates that Greater Parramatta is the metropolitan centre of the Central City District.*
>
> *The planning proposal seeks to deliver the vision of the Central River City through additional jobs and dwellings. The draft LEP seeks to balance this growth with the liveability and other priorities within the Plan.*
>
> *The Department is satisfied that the draft LEP gives effect to the District Plan in accordance with section 3.8 of the EPA Act.*

Metropolis of Three Cities

The Planning Proposal is aligned with these key themes, directions, metrics and objectives by:

1. Infrastructure and collaboration. The subject land is located within Parramatta CBD. The site is located within easy access of exiting health services infrastructure as well as existing schools. The Parramatta CBD benefits from existing heavy rail and bus transport services. Parramatta Light Rail is under construction and the Metro rail is a committed infrastructure project. The site is within 5 minute walking distance to the new light rail station. Additionally, there is a bus stop is located on the site frontage to O'Connell Street.

2. Liveability. The architectural concepts provided with this Planning Proposal and the relevant urban design analysis show that liveability for the future residents is a primary consideration. Proximity to Parramatta River, employment, transport, and retail are significant features of the site. Additional considerations that contribute to liveability, such as views, are implicit in the proposal. The proposal is also consistent where it is located in proximity to several public open spaces and cultural facility, Belmore Park and the Parramatta Female Factory Precinct.

3. Productivity. The proposal capitalises on the existing Parramatta CBD and will provide a part in contributing to sustainable future growth. Additionally, the development is proposed to provide 756m^2 of retail spaces and 501m^2 of commercial area. This will enable increase job opportunity for the community and for the activation of street frontages.

4. Sustainability. The Planning Proposal facilitates building capacity based on existing and committed infrastructure. This seeks to shape a strong and connected community.

The following objectives are relevant to the proposed development:

Objective 1 – Infrastructure supports the three cities

The proposed development is proximate to Parramatta CBD and will enable people to live in walking distance to train station, bus services which services to Sydney CBD within 30minutes. The site is also within walking distance to the new light rail station and bus stops which will enable further connection around Sydney. The development will support current and future infrastructure in Parramatta CBD.

Objective 7 – Communities are healthy, resilient and socially connected:

The site is proximate to numerous cultural and recreational facilities and opportunities such as Parramatta River, Parramatta female factory, Old Orchard Park, Parramatta Gaol and Prince Alfred Square. The proposal will enable greater number of people live in close proximity to quality open spaces which will enable an active and socially connective community. As mentioned the site is within walking distance to numerous public transport and will reduce dependency of personal vehicle and encourage active transport methods.

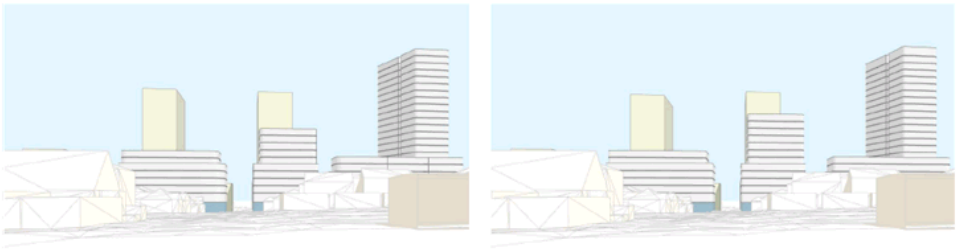
Objective 10 – Greater housing supply:

The proposed development will deliver new dwellings within North Paramatta and will contribute to the housing needs of Greater Sydney and particularly Parramatta CBD.

Objective 12 – Great places that bring people together

The proposed development will improve the public domain of both O'Connell Street and Albert Street through new foot paths, through-site links and commercial, retail spaces on ground floor. The development will revitalise the area and will play a key role in providing high-quality spaces within North Parramatta. The through site link identified in the DCP can be visualised in the montage below.

Montage 2: View west along Harold Street, to the through site link, comparing the Council masterplan massing and the Planning Proposal Massing (DKO)



Council PP Massing Amended PP Massing

Objective 14 – A Metropolis of Three Cities – integrated land use and transport creates walkable and 30-minute cities

The development will support people to live within close proximity to Parramatta CBD and will support the provision of a 30 minute City. The site is within proximity to number of public transport methods which will enable people to get to Sydney CBD and other strategic centres within 30 minutes.

Central City District Plan

The Central City District Plan sets out the priorities and actions for this District and these are structured around the same key themes as presented in the Greater Sydney Region Plan. As relevant to the subject site the importance of the growth within strategic centres in terms of both jobs and housing are continually emphasised in the District Plan. The Planning Proposal seeks to deliver both additional housing but also jobs within a 30-minute city scenario.

The Planning Proposal seeks to deliver housing and employment to the market quickly and in a highly liveable and accessible and central location.

C1. Planning for a city supported by infrastructure

The proposal will support economic growth within North Parramatta with additional retail and commercial spaces. Additionally, the development will enable increased number of people to live within walking distance to public transport facilities, optimising the opportunity.

C4 Fostering healthy, creative, culturally rich and socially connected communities

The site benefits from the proximity of public transport and will encourage use of active transport methods and less reliance on personal vehicles. The site additionally benefits from numerous cultural and recreational facilities and opportunities such as Parramatta River, Parramatta female factory, Old Orchard Park, Parramatta Gaol and Prince Alfred Square.

C5 Providing housing supply, choice and affordability, with access to jobs, services and public transport

The proposal will provide a diverse housing choice within North Parramatta with different apartment mixes. The proposal will provide approximately 370 dwellings within walking distance to public transport, employment opportunity and quality open spaces.

C6 Creating and renewing great places and local centres and respecting the District's heritage

The proposal will improve public domain on both O'Connell and Albert Street and contribute to the urban renewal of the north Parramatta Precinct. Additionally, the proposed building forms appropriately responds to the neighbouring heritage items through design and stepping down of the building form.

C7 Growing a stronger and more competitive Greater Parramatta

The development is in walking distance to new public transport infrastructure the light rail. Enabling people to live in close proximity to Parramatta CBD and optimising new public infrastructure.

C8 Delivering a more connected and competitive GPOP Economic Corridor

The proposal will provide additional dwellings within North Parramatta, commercial and retail floor space in close proximity to parramatta CBD. The proposal assists in the delivery of a competitive and more connected GPOP Economic Corridor.

C9 Delivering integrated land use and transport planning and a 30-minute city:

The proposal aims to capitalise on the sites potential and provide mixed-use residential development which contributes to people living within the 30-minute city. The site is well-served by public transport and supports walkability to Parramatta CBD.

C10 Growing investment, business and job opportunities in strategic centres.

Parramatta CBD is identified as strategic centre and the development will support additional job opportunities during construction and throughout the operation with the proposed childcare facility and retail premises, contributing to job growth.

C19 Reducing Carbon emissions and managing energy, water and waste efficiently.

The subject site significantly benefits from the proximity to public transport services and Parramatta CBD. The development will promote walkability and less reliance on vehicles, thus reducing carbon emissions.

In summary, this Planning Proposal seeks to deliver on the vision set forward in the Central City District Plan by:

1. Increasing diversity of housing choice.
2. Delivering housing to meet strategic housing supply targets.
3. Contribution to energy efficiency through aims to deliver a development that meets environmental performance criteria.
4. Reduced emissions through both building environmental performance but also through reduction in reliance on private vehicle travel. Focusing increased housing on the subject site which is highly accessible to local bus and train services means that future residents are more likely to walk, cycle and use integrated public transport systems.
5. Enhancing the role of Parramatta as the economic anchor with the vision to deliver both jobs and housing.
6. Provision of new through-site links and activation of street frontages.
7. Contributing to retail and commercial floor space, which provides employment, and will meet a growing retail demand in the area.

The objectives of the Planning Proposal are incontestably aligned with the documented priorities for the Central City District. The following are key objectives where the proposal will meet these.

4 Is the planning proposal consistent with a council LSPS that has been endorsed by the Planning Secretary or GSC, or another endorsed local strategy or strategic plan?

Parramatta Local Strategic Planning Statement

The Parramatta Local Strategic Planning Statement came into effect on 31 March 2020 and this document sets out the 20-year vision for land use planning for the City of Parramatta. The LSPS contains 16 planning priorities under 4 key themes which are:

- Local planning priorities.
- Liveability planning priorities.
- Productivity planning priorities.
- Sustainability planning priorities

The planning principles relevant to the proposal are addressed below.

7. Provide for a diversity of housing types and sizes to meet community needs into the future

Council policy direction 24 which fall within this priority is relevant to the proposal and is addressed below.

P24 Provide for a range of housing types and sizes that cater to the Parramatta community to ensure housing diversity consistent with the City of Parramatta Local Housing Strategy (once endorsed by Council and DPIE).

As per the findings of the Parramatta Local Housing Strategy (addressed in detail below), by 2036, the population of the City of Parramatta LGA is anticipated by over 175,000 people to a total of over 416,000 people and is expected to need an additional 77,000 dwellings to accommodate this population growth. The LHS notes that the investigation outcomes of this Strategy indicate that the population is likely to increase even more substantially. Furthermore, seniors and elderly are expected to grow by 34,317 or 64%. As a result, the LHS identified that future housing supply will need to accommodate older and less able residents such as seniors and elderly residents.

The proposal will allow for the construction of new residential units, which will fulfill the housing needs of the locality as identified by the LHS.

The following planning priorities are especially applicable to the proposal.

Objective 1 – Expand Parramatta's economic role as the Central City of Greater Sydney

The proposed development will contribute to the job growth within Parramatta CBD not only during construction but within the course of operation. The proposed development is a mixed-use building which will have retail, commercial gross floor space contributing to support the growth of Parramatta CBD and specifically North Parramatta.

Objective 4 – Focus housing and employment growth in the GPOP and Strategic Centres; as well as stage housing release consistent with the Parramatta Local Housing Strategy.

The proposed development is for a mixed use and will contribute to housing and additional commercial, retail floor space within North Parramatta. The development will facilitate the delivery of dwellings within Parramatta CBD, consistent with the Local Housing Strategy.

Objective 7 – Provide for a diversity of housing types and sizes to meet community needs into the future.

The proposed development is for a mixed-use residential development which provides diversity in the apartment mixes, providing diverse housing market for people in different stages of life.

Objective 10 – Improve active walking and cycling infrastructure

The proposed development will improve the public domain on both Hassall Street, and Harris Street with new pedestrian footpaths and activation through provisions of commercial, retails spaces within the ground floor.

Objective 11 – Build the capacity of the Parramatta CBD, Strategic Centres, and Employment Lands to be strong, competitive and productive

The proposed development will maximise the site potential and contribute to the growth of North Parramatta supporting Parramatta CBD. The development will allow increase number of people to live in walking distance to CBD centre, public transport and within 30 minutes to other strategic centres such as Sydney CBD, Olympic Park and Macquarie Park.

Parramatta Local Housing Strategy

The Local Housing Strategy (LHS) seeks to provide direction at the local level about when and where future housing growth will occur.

The key findings of the LHS relating to this proposal are reflected below.

Parramatta is one of the fastest-growing LGAs in Greater Sydney

The City's growth rate is a product of sustained strategic planning over many years, and in recent years the LGA has seen some of the most dwelling completions of any LGA in Greater Sydney.

It already has a larger population than the City of Sydney and is expected to grow more than the City of Sydney over the next 20 years, reflecting the growing role of Parramatta as Sydney's second CBD. As the City—particularly the CBD and Westmead Innovation District—continues to strengthen economically, people will be attracted to living close to these important employment agglomerations.

The City of Parramatta is an LGA undergoing unprecedented change and transition. The population of the City is anticipated to grow by between 74% - 77% over the next 20 years (depending upon use of ABS or DPIE forecasts), making it more populous than the City of Sydney.

Not only will the City of Parramatta grow more than the City of Sydney; the population is anticipated to grow the most in absolute numbers by 2036 of any LGA in Greater Sydney - by over 175,000 people to a total of over 416,000 people (DPIE forecast figures, 2016).27 That would make Parramatta the third most populous LGA behind Blacktown and Canterbury-Bankstown.

On the basis of DPIE 2016 demographic projections alone, the City is anticipated to need an additional 77,000 dwellings to accommodate this population growth, which represents an increase of around 3,850 dwellings a year. However, it should be noted, the investigation outcomes of this Strategy indicate that the population is likely to increase even more substantially.

Every age group is set to grow in Parramatta

Unlike the City of Sydney, where the younger working age population is the dominant demographic (which is in a relatively mature state in terms of economic versus residential function) (see Figure 8), Parramatta's population spans every service age group, and every age group is growing (see Figure 9). The City's anticipated growth to 2036 will include an additional:

- *69,200 additional workers with a 233,200 total workforce – 30% growth*
- *12,951 young workforce (25-34) - 21% growth*
- *39,546 parents and homebuilders (35-49) and corresponding growth in dependents - 44% growth*
- *8,599 tertiary / early career (20-24) - 34% growth*
- *34,317 seniors (70-84) and elderly (85+) - 64% growth.*

Future housing supply will need to:

- ***Accommodate older and less able residents such as seniors and elderly residents.***

The key findings of the LHS show that, by 2036, the population of the City of Parramatta LGA is anticipated by over 175,000 people to a total of over 416,000 people and is expected to need an additional 77,000 dwellings to accommodate this population growth. The LHS notes that the investigation outcomes of this Strategy indicate that the population is likely to increase even more substantially. Furthermore, seniors and elderly are expected to grow by 34,317 or 64%. As a result, the LHS identified that future housing supply needs to be addressed.

5 Is the planning proposal consistent with any other applicable State and regional studies or strategies?

Yes

The investment in new infrastructure is exceptional in Parramatta CBD with the construction of Parramatta Light Rail, the construction commencing on Sydney Metro, and the attention to pedestrian and cycling facilities, routes, and experiences in the CBD.

Parramatta CBD is also undergoing a radical change in intensity of employment and housing within the CBD, as facilitated and encouraged by State and Local planning initiatives.

The Planning Proposal is consistent with the changing planning circumstances and elevation of Parramatta CBD within the Sydney metropolitan area, and the resulting change in planning controls within the city centre.

Site specific MERIT

This paper has already considered previously the site specific merits of the proposal, including –

- Location of increased height in the north western location identified in the planning controls;

- Providing housing supply that was intended by the controls, noting that the site to the east has been redeveloped for a 1-2 storey aged care facility and not the intended tall tower encouraged in the planning controls;

- Proposing a better arrangement of buildings on the site that reduce the number of buildings from 5 buildings to a reallocation of built form for a single point tower to the north and an arrangement of buildings ranging from 6-12 storey.
- Reorientatate the buildings for superior solar access outcomes; provide appropriate separation; and retain the proposal for a through site link;
- Provision of retail space on a large consolidated site that enables specialised retailing, which is in increasing demand in the area;
- Capitalising the sites excellent public transport services, and its proximity to Parramatta CBD that contains retailing, employment, services, facilities, recreational opportunities, arts and culture, and the like; and
- The proposal responds to the heritage conservation area east of the site through appropriate transition in building heights, and intended modulation of the form in response to the HCA.

The Planning Proposal seeks:

- Floor Space Ratio of 3.9:1
- A Height of Building of 78m

6 Is the planning proposal consistent with applicable SEPPs?

The following table provides a brief assessment of consistency against each State Environmental Planning Policy (SEPP) relevant to the planning proposal.

Consideration of relevant SEPPs	Comment
SEPP (Biodiversity and Conservation) 2021	Consistent. The site is not identified as a Koala habitat and contains no significant vegetation.
SEPP (Sustainable Buildings) 2022	The planning proposal is consistent with the aims or provisions of this SEPP. Future development will be subject to the provisions of this SEPP.
SEPP (Except and Complying Development Codes) 2008	Not applicable.
SEPP (Housing) 2021	The proposal is consistent with the intent of the Housing SEPP. Future development under the SEPP remains permissible, though rezoning of the site may expand opportunities for a greater diversity and type of housing.

	The planning proposal seeks to facilitate high-density housing in the form of a residential flat building. An urban design study submitted with this planning proposal considers potential design options which address the provisions of Chapter 4 of the Housing SEPP and the ADG.
SEPP (Industry and Employment) 2021	Not applicable.
SEPP (Resilience and Hazards) 2021	The existing uses of the site include residential development which are unlikely to result in contamination of the land. The planning proposal is consistent with the aims and provisions of this SEPP. In any case, future redevelopment of the site will need to address the requirements of the SEPP. The proposal is consistent with the provision of this SEPP. The proposal is supported by a detail site investigation report which confirms that the site can be made suitable for the proposed mixed-use development in accordance with this SEPP.
SEPP (Transport and Infrastructure) 2021	Future development may constitute traffic generating development and trigger an assessment under this SEPP.
SEPP (Planning Systems) 2021	It is likely that future development of the site will constitute Regional Development and be determined by the Sydney West Planning Panel.
SEPP (Resources and Energy) 2021	Not applicable.
SEPP (Primary Production) 2021	Not applicable
SEPP(Precincts—Central River City) 2021	Not applicable
SEPP (Precincts—Eastern Harbour City) 2021	Not applicable
SEPP (Precincts—Regional) 2021	Not applicable
SEPP (Precincts—Western Parkland City) 2021	Not applicable

7 Is the planning proposal consistent with applicable Ministerial Directions (section 9.1 Directions) or key government priority?

Ministerial Directions	Comments
Focus Area 1: Planning Systems	
1.1 Implementation of Regional Plans	This proposal is consistent with the objectives and strategies of A Metropolis of Three Cities as outlined in the Planning Proposal report. Refer to Part 3 – Justification of this report, Section B – Relationship to Strategic Planning Framework of the Planning Proposal for an explanation of the consistency of the Planning Proposal. The planning proposal achieves the overall intent of the Plan and seeks to implement the achievement of its vision, land use strategy, policies, outcomes or actions. This planning proposal seeks to facilitate development of these key parcels of land within the Parramatta CBD which will encourage economic investment in this strategic centre, employment.
1.2 Development of Aboriginal Land Council Land	Aboriginal and archaeological investigations will be completed as part of the future detailed design and development application documentation.
1.3 Approval and Referral Requirements	The Planning Proposal does not introduce any provisions that require any additional concurrence, consultation or referral.
1.4 Site Specific Provisions	The planning proposal relates to building height and floor space ratio provisions. This planning proposal does not impose any development standards or requirements in addition to those already contained in the principal environmental planning instrument being amended.
1.4A Exclusion of Development Standards from Variations	The planning proposal does not seek a development standard that is excluded from Cl.4.6 of the Parramatta LEP 2023
Focus Area 1: Planning Systems – Place Based	Not relevant to the subject planning proposal.
Focus Area 2: Design and Place	Directions not made.
Focus Area 3: Biodiversity and Conservation	Not relevant to the subject planning proposal.
3.2 Heritage Conservation	The site is within several heritage items and conservation area. As noted in the Heritage assessment, the use of lower building form proposed along O'Connell Street is an adequate response to the neighbouring Heritage Conservation Area.

3.9 Sydney Harbour Foreshore and Waterways Area	Not within a foreshore or waterway area.
Focus Area 4: Resilience and Hazards	
4.1 Flooding	The site is not within the 1 in 100 year Average Recurrence Interval, and it is within the Probable Maximum Flood (PMF) area. Any potential impacts because of development on the site, such as stormwater runoff, will be considered and addressed appropriately at relevant DA stages. This will also include any design detail required to ensure compliance with Council's water management controls within the Parramatta DCP.
4.2 Costal Management	Not relevant to the subject planning proposal.
4.3 Planning for Bushfire Protection	Not relevant to the subject planning proposal.
4.4 Remediation of Contaminated Land	The existing uses of the site include residential development which are unlikely to result in contamination of the land. The planning proposal is consistent with the aims and provisions of this SEPP. In any case, future redevelopment of the site will need to address the requirements of the SEPP. The proposal is consistent with the provision of this SEPP. Attached detailed site investigation confirms that the site can be made suitable for the proposed mixed-use development.
4.5 Acid Sulfate Soils	The site is identified as Class 5 on the Acid Sulfate Soils Map in Parramatta Local Environmental Plan 2023. This will be addressed further at the development application stages.
Focus Area 5: Transport and Infrastructure	
5.1 Integrating Land Use and Transport	The Planning Proposal is consistent with this direction, in that it: - will provide new dwellings near existing public transport links - will enable residents to walk or cycle to work if employed in the Parramatta City Centre or utilise train and ferry services. - will maintain and provide additional commercial premises in proximity to existing transport links - makes more efficient use of space and infrastructure by increasing densities on an underutilised site.
5.2 Reserving Land for Public Purposes	Not relevant to the subject planning proposal.
5.3 Development Near Regulated Airports and Defence Airfields	Not relevant to the subject planning proposal.

5.4 Shooting Ranges.	Not relevant to the subject planning proposal.
Focus Area 6: Housing	
6.1 Residential Zones	The Planning Proposal is consistent with this direction, in that it: - facilitates additional housing in the Parramatta CBD - provides residential development in an existing urban area that will be fully serviced by existing infrastructure - does not reduce the permissible residential density of land. - Deliver diverse apartment mixes.
6.2 Caravan Parks and Manufactured Home Estates	Not relevant to the subject planning proposal.
Focus Area 7: Industry and Employment	
7.1 Employment zones	No change proposed to the current MU1 Mixed Use zone.
7.2 Reduction in non-hosted short-term rental accommodation period	Not relevant to the subject planning proposal.
7.3 Commercial and Retail Development along the Pacific Highway, North Coast	Not relevant to the subject planning proposal.
Focus Area 8: Resources and Energy	Not relevant to the subject planning proposal.
Focus Area 9: Primary Production	Not relevant to the subject planning proposal.

SECTION C – ENVIRONMENTAL, SOCIAL AND ECONOMIC IMPACT

8 Is there any likelihood that critical habitat or threatened species, populations or ecological communities, or their habitats, will be adversely affected because of the proposal?

The subject site does not contain habitat of any description. There is no likelihood that critical habitat or threatened species, populations or ecological communities, or their habitats, will be adversely affected as a result of the planning proposal. No further assessment is considered necessary at this stage of the planning proposal.

9 Are there any other likely environmental effects of the planning proposal and how are they proposed to be managed?

The Planning Proposal seeks to revise the maximum permitted building height and floor space ratio controls contained within Parramatta LEP 2023 in order to facilitate the redevelopment of the subject site for the purpose of high-density mixed use development. The anticipated environmental effects associated with the development that will be permitted by the amendment are limited to additional local traffic impacts and potential for overshadowing impacts to surrounding development. The proposal

has been carefully designed to ensure the adjoining developments are able to maintain an acceptable level of solar access. The built form as shown in the reference design is born of solar access and impact modelling that has been carefully refined throughout the urban design process. Beyond this there are no significant anticipated environmental effects resulting from the Planning Proposal.

The built form also addresses the neighbouring heritage items and conservation areas through the step-down model towards O'Connell Street. As mentioned previously this design response has been supported by a heritage assessment.

10 Has the planning proposal adequately addressed any social and economic effects?

A suite of studies has been prepared and discussed earlier in this Planning Proposal which assesses the social and economic effects (see Technical Studies chapter of this Planning Proposal).

The social and economic effects of the Planning Proposal are most appropriately described in the context of the challenges associated with a growing population as described in the State Government document the Metropolis of Three Cities. Among other things, the Plan explains that to meet the needs of a larger population and to maintain economic growth, urban renewal in combination with infrastructure delivery must occur in strategic urban centres.

As previously described, the objective of the Planning Proposal aligns closely with the strategic direction identified in the Metropolis of Three Cities. The delivery of high-density housing in a location that is well serviced by infrastructure and where there are minimal existing environmental site constraints is considered to represent a positive social outcome.

The Planning Proposal will facilitate future development that will result in higher population densities in Parramatta. In this regard, the Planning Proposal will support the emergence of Parramatta as Sydney's Central City which will in turn contribute to continued economic growth.

A key component of the preferred future development option for the subject site incorporates an area of public open space. The public open space will have excellent connectivity to public transport and will serve to promote healthy lifestyles and social interaction.

SECTION D – INFRASTRUCTURE (LOCAL, STATE AND COMMONWEALTH)

11 Is there adequate public infrastructure for the planning proposal?

The site is suitable for high density residential development due to its superior access to transport and employment opportunities in the Parramatta CBD. The site is located within the proximity of Parramatta CBD but also the new Parramatta light rail will be approximately 250m from the site and the rail about 1.5km from the site which connects to the T1, T2 and T5 trainlines.

Given the proximity of the subject site to public transport services including the new light rail services, bus services it is anticipated that a significant proportion of new residents would opt to use public transport rather than private vehicle.

The subject site is within proximity of Parramatta CBD which has a variety of health, education and emergency services. In a broader context, the subject site is proximate to Westmead Hospital and the Western Sydney University which are regional institutions.

The Council has endorsed an infrastructure strategy as part of the Parramatta CBD Planning Proposal which is actualised through the floor space ratio controls proposed within the Parramatta CBD Planning Proposal. Equally the subject site has been informed by the PNUT strategy that sets heights and FSR yields. It has been previously discussed that the planning proposal is responsive to these controls and urban form, noting that the adjoining site is not proceeding with redevelopment consistent with the controls and the subject proposal will deliver on the aspirations for housing supply and retail sought for the street block.

SECTION E – STATE AND COMMONWEALTH INTERESTS

12 What are the views of the State and Commonwealth public authorities and government agencies consulted in order to inform the Gateway determination?

The Planning Proposal has not yet received Gateway determination and consultation with the public authorities has not yet commenced.

PART 4 – MAPS

It is understood that mapping will be prepared by the City of Parramatta Council to accord with the standard instrument mapping layouts prior to the Planning Proposal being reported to the Council for consideration. The planning proposal seeks amendments to Height of Buildings Map and Floor Space Ratio and Map.

PART 5 – COMMUNITY CONSULTATION

Community consultation will be undertaken in accordance with the requirements prescribed by the Gateway determination.

PART 6 – PROJECT TIMELINE

A project timeline is yet to be determined however will be formulated following discussions with the City of Parramatta Council and confirmation of any additional information required to allow consideration of the Planning Proposal.

An indicative timeline for the planning proposal includes:

Milestone	Timeframe
Consideration by council	February 2024
Council decision	March 2024
Gateway determination	April/ May 2024
Pre-exhibition	May 2024
Commencement and completion of public exhibition period	May/ June 2024
Consideration of submissions	July/August 2024
Post-exhibition review and additional studies	August 2024
Submission to the Department for finalisation (where applicable)	September/ October 2024
Gazettal of LEP amendment	December 2024

CONCLUSION

This Planning Proposal explains the intended effect of and provides a justification for a proposed amendment to the *Parramatta Local Environmental Plan 2023* (Parramatta LEP 2023). The Planning Proposal has been prepared in accordance with Section 3.33 of the *Environmental Planning and Assessment Act 1979* and the Department of Planning and Environment's document Local Environmental Plan Making Guideline August 2023.

The Planning Proposal relates to land at 31 O'Connell and 9 Albert Street, North Parramatta and seeks to amend the Parramatta Local Environmental Plan 2023 by amend the maximum building height to 78m and the maximum floor space ratio to 3.9:1.

The Planning Proposal describes how the intended outcome of the proposed LEP amendments align closely with the strategic directions established in State Government documents as demonstrated below:

- A Metropolis of Three Cities – Greater Sydney Region Plan,
- The Central City District Plan,

- Parramatta Local Strategic Planning Statement
- Parramatta Housing Strategy
- Parramatta North Urban Transformation Strategy

It is considered that the LEP amendments sought by the planning proposal will allow for the accelerated delivery of both mixed use and high-density residential development in an area which is well serviced by public transport and infrastructure and has been identified as a key urban renewal precinct. The planning proposal is considered to have strong merit based on a sound analysis of relevant planning considerations and is submitted to Parramatta City Council for consideration.

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SITE SPECIFIC DCP – 9 Albert Street and 31 O'Connell Street North Parramatta

8.2.2 PARRAMATTA NORTH URBAN TRANSFORMATION PRECINCT

In addition to the general provisions set out in Section 8.2.2 Parramatta North Urban Transformation Precinct, the following specific provisions apply to specific land identified in the land application map below. This Section should be read in conjunction with Part 4 – Non-Residential Development and Part 3 – Residential Development of this DCP. To the extent of any inconsistencies, the specific provisions within this Section shall prevail.

8.2.2.12.15 LOTS H2-H5

This Section applies to a 8,921m2 land parcel in North Parramatta that has frontage to O'Connell Street and Albert Street, as shown in Figure 8.2.2.12.15.2. The site comprises 2 individual land parcels: Lot 1, DP 998240 and Lot 1 DP 1143431.

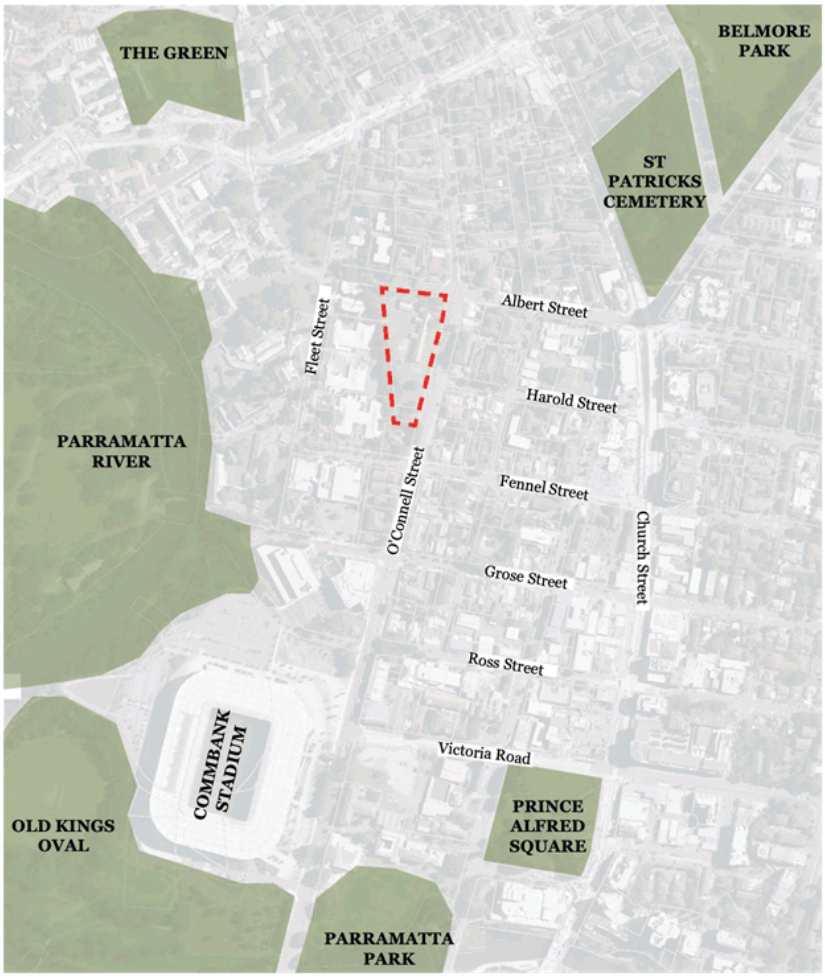

Figure 8.2.2.12.15.2 – Land application map

8.2.2.1 BUILT FORM GENERAL

Objectives

O.3 Contribute to the design quality of the Parramatta North heritage precinct and surrounding conservation areas.

O.4 Provide a publicly accessible through site link aligned to Harold Street that provides a view corridor and supports movement and wayfinding.

O.5 Arrange podiums and towers on the site to reduce view impacts from the Female Factory heritage precinct, establish and reinforce view corridors, and respond to the site's natural topography.

Controls

C.1 Development is to be consistent with the arrangement of buildings and the through site link in Figure 8.2.2.12.15.3.

C.2 A maximum of two towers is permitted on the site.

C.3 Locate the tallest tower at the corner of O'Connell Street and Albert Street to reinforce the corner.

C.4 Towers should be oriented East-West to minimise view impacts from the Female Factory heritage precinct.

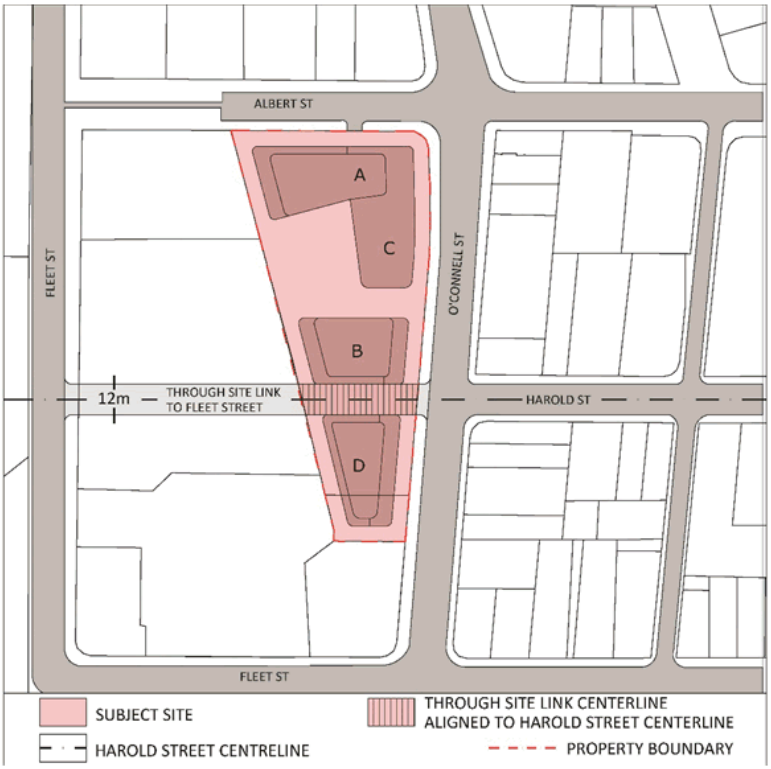

Figure 8.2.2.12.15.3 –Site structure plan

8.2.2.2 BUILT FORM AND MASSING

Objectives

O.1 Provide a street wall at an appropriate height to spatially define O'Connell Street and Albert Street that is well proportioned, of a human scale, that has minimal erosions or interruptions and finely grained, with facades of tactile material quality.

O.2 Set back towers above street walls as clearly distinct, slender free-standing buildings to mitigate visual, wind and urban heat impacts, enable views to the sky and protect amenity in streets and public places.

O.3 Orient towers to optimise solar access, natural ventilation and privacy while minimising view impacts from the heritage context and adjoining land.

O.4 Establish an appropriate height of building strategy to positively respond to the local context.

O.5 Provide adequate building separation and building lengths to appropriately proportion the built form, optimise solar access and natural ventilation, views to sky and privacy.

O.6 Provide an activated, accessible ground floor retail interface with fine grain uses to enhance the character and function of O'Connell Street.

O.7 Ensure all residential buildings have a legible, direct street address to aid in wayfinding.

O.8 Ensure that building form achieves comfortable public domain conditions for pedestrians, with adequate daylight, appropriate scale, and mitigation of urban heat and wind impacts.

O.9 Materiality and architectural design to respond to Parramatta North Heritage context and conservation areas and contribute to the revitalisation of the precinct.

Controls

Building Heights

C.5 The maximum building height in storeys is to be in accordance with Figure 8.2.2.12.15.4.

C.6 The street wall height must be a minimum of 14 metres and a maximum of 23 metres above the footpath level (4-6 storeys).

C.7 Maintain a consistent street wall height in storeys along the O'Connell Street frontage.

C.8 Transition the above-podium building heights along O'Connell Street, from the tallest on Albert Street down to the Southern edge of the site.

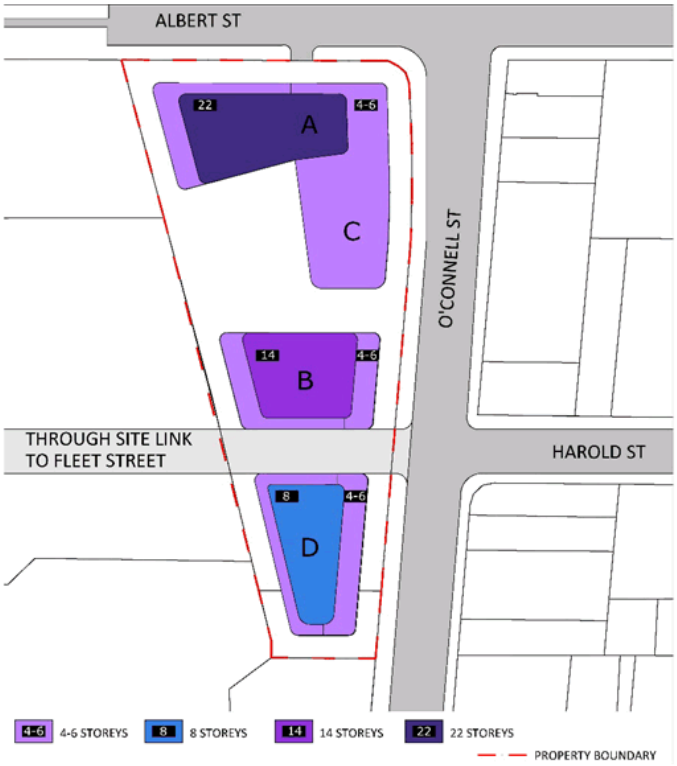

Figure 8.2.2.12.15.4 – Building Height Map

Building Setbacks

C.9 Podium Setbacks are to be consistent with Figure 8.2.2.12.15.5.

a) The podium is to be setback 6m from O'Connell Street and Albert Street. This setback is to be free of any below ground structure (no basement underneath) and must provide for large canopy trees, both in the residential section and in the publicly accessible section.

b) A podium setback of 6m is to be provided for deep soil along the western and southern boundary for landscaping and large canopy tree planting.

c) Provide a 0m podium setback to the through site link.

C.10 Upper-level setbacks to be consistent with Figure 8.2.2.12.15.5.

d) The setbacks to the tower above the podium are a minimum of 3m fronting Albert Street and 6m fronting O'Connell Street.

e) Levels above the podium to the through site link should be setback 3m to allow for building separation and views to sky.

C.11 Podiums should be built to align with setbacks to their entire height.

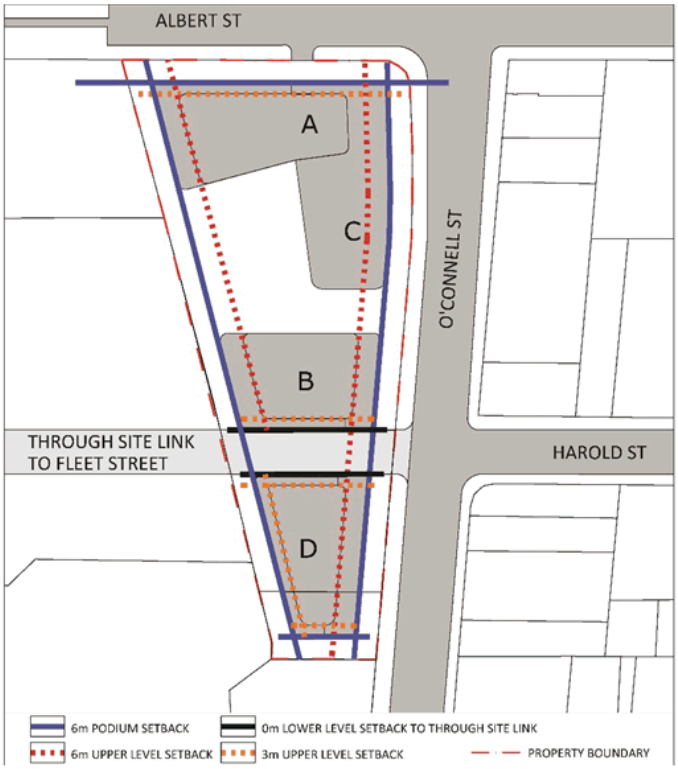

Figure 8.2.2.12.15.5 – Building Setbacks map

Building Separation

C.12 Provide a break in the podium, of minimum width 12m, between buildings B and C.

Building Design

C.13 The street wall should be modulated vertically in segments that relate to the fine grain subdivision pattern evident in the locality.

C.14 Undercrofts or other interruptions of the street wall or ground floor which expose the underside of the podium or tower and amplify its presence on the street or in publicly accessible open spaces are not permitted.

C.15 Ensure building services are concealed and screened from the public domain, where appropriate.

C.16 The street wall, particularly as articulated at the corner of O'Connell Street and Albert Street, must be of solid architectural expression to ground the built form and frame the street.

C.17 Podium building lengths to be maximum 70m to ensure adequate breaks in the built form to reduce bulk.

C.18 Colonnades are not supported as they are not a typological element used in the area, they restrict views of retail frontages and fragment the street interface.

C.19 Street wall facades should:

a. Be consistent in materiality and rich in architectural detail.

b. Be of predominantly masonry character with no lightweight panel construction or curtain walling.

c. Be articulated with depth, relief and shadow on the street facade. A minimum relief of 150mm between the masonry finish and glazing face must be achieved.

d. Utilise legible architectural elements and spatial types - doors, windows, pilasters, sills, plinths, frame and infill, etc. - not necessarily expressed in a literal traditional manner.

e. Awnings are thoughtfully integrated into the design.

C.20 The maximum tower floorplate length is 48 metres.

C.21 The floorplate must be measured to the outside face of the building including balconies, vertical and horizontal circulation, internal voids, and external walls.

C.22 The maximum floorplates for towers of more than 6 storeys to be 950^2 (gross building area).

C.23 Tower forms should be setback, differentiated from the street wall as a separate architectural element, and should be distinct and different in character from the podium.

C.24 Roof fixtures, lift overruns and service plants are to be incorporated into the design of the roof, to minimise visual intrusiveness, not be visible from the public domain and ensure a consistent street wall height.

Active Frontages/ Retail Ground Floor Frontage

Active frontage location and extent to be consistent with Figure 8.2.2.12.15.6.

C.25 Each commercial tenancy should have an individual entry path from the street at existing ground level that minimises the need for vertical circulation, is legible and well-lit. A clear path of travel must be provided in the public domain as defined in the Public Domain Guidelines.

C.26 Active uses must fully occupy the ground floor frontage not taken up by services or vehicular access.

C.27 Access ramps and stairs, where necessary, should be incorporated inside the building envelope.

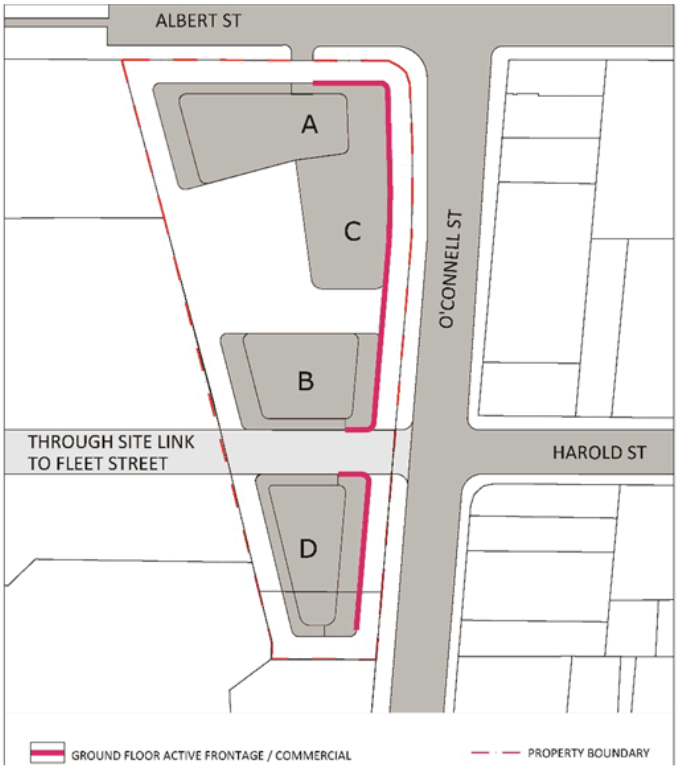

Figure 8.2.2.12.15.6 – Active Frontage Map

Residential Ground Floor Frontage

C.28 Ground floor apartments fronting Albert Street are to have individual building entrances.

C.29 Ground floor apartments not directly facing a street should be accessed via a lobby entrance fronting O'Connell or Albert Street.

C.30 Ensure equitable access to the residential lobby.

Building Address

C.31 Residential access to each building is to be provided with a direct legible street address.

C.32 Primary building entrances are to be from the street and not internal through site links.

C.33 Residential entries should have an individual entry path from the street at existing ground level that minimises the need for vertical circulation, is legible and well-lit.

C.34 Building entries should be clearly identifiable and communal entries should be clearly distinguishable from private entries.

C.35 Building entries and lobbies to residential apartments are to be separated from commercial entrances to provide secure and identifiable addresses.

C.36 Minimum floor to floor height is to be provided as follows:
- Ground floor retail/ Commercial – 4.5m.
- Podium commercial -3.8m.
- Ground floor Residential – 4m

- Residential – 3.1m.

Materiality

C.37 Facades of buildings should be designed with a balance of consistent horizontal and vertical elements that express the building's architecture.

C.38 The street wall should provide a modest and linear backdrop to the heritage buildings across the road, without trying to draw attention, pretending to mimic or compete with them.

C.39 Light materials and generous fenestrations should be used in the expression of towers to reduce visual bulk.

C.40 The site requires a limited materials and colour palette to achieve a cohesive built form related to the retained historic built legacy, which includes an established tradition of building in sandstone and red brick.

C.41 Materials must be selected to relate to the visual characteristics and significance of the heritage buildings.

C.42 Precast concrete is not to be used as the primary façade material unless there is acceptable articulation, surface treatment, and integration with other architectural elements.

C.43 The modulation, proportions and rhythm of the design of development in the vicinity of heritage items must respond to the scale and visual character of heritage items.

8.2.2.3 PUBLIC DOMAIN, COMMUNAL OPEN SPACE AND LANDSCAPING

Objectives

O.10 Create a clear delineation between public and private spaces.

O.11 Provide adequate deep soil zones.

O.12 Retain and respond to the character of the historic Quarry Face through design.

O.13 Provide high amenity, accessible communal open spaces which are co-located with deep soil.

O.14 Ensure that buildings and landscaped spaces respond to the natural site topography.

O.15 Strengthen and support high quality landscaping and canopy trees in the public domain and the publicly accessible private spaces.

Controls

Communal Open Space, Deep Soil and Landscape

C.44 Deep soil and landscaping to be consistent with Figure 8.2.2.12.15.7.

C.45 Communal open space to demonstrate the following requirements:

a. Direct, equitable access should be provided to communal open space areas from common circulation areas, entries and lobbies.

b. Basement alignment to be contained within the 6m boundary setback, with a minimum of 650sqm of communal open space provided as deep soil, consolidated into a well-designed, easily identified and usable area.

c. Adequate landscaped separation between residential uses and communal open space is required to allow for privacy and impact from noise pollution.

d. Communal spaces provided on building rooftops are considered as secondary spaces and should not preclude access to the ground level communal space from all buildings.

e. Rooftop communal spaces should be accessible and include all amenities and associated services.

C.46 Deep soil to demonstrate the following requirements:

a. Deep soil to be co-located with communal open space.

b. A minimum of 30% of the site is to comprise deep soil

C.47 Landscape areas to demonstrate the following requirements:

a. Provision should be made for large trees in the 6m setbacks to Albert Street and O'Connell Street.

b. The intent of the 6m setback in deep soil along the western and southern boundary is to provide a landscape buffer with large tree canopy. Unless directly adjacent to communal open space, this setback should not contribute to minimum communal open space area requirements.

c. Where basements extend beyond the building envelope (where not precluded by other controls in this DCP), and are required to house trees and plants, the slab set-downs must incorporate allowances for drainage layers, services if any, and paving & associated slab depths over and above a minimum clear soil depth of 1.2m, measured from the top of the slab. Where multiple trees are required on set down slabs, the slab set downs should be contiguous.

d. Ensure landscaping is provided at natural ground level adjacent to the boundary, without retaining walls, to respond to the natural topography of the sandstone quarry.

Figure 8.2.2.12.15.7 – Communal Open Space, Deep Soil and Landscape map

C.48 The Public Domain/publicly accessible landscape area interface along Albert Street and O'Connell Street is to:

a. Provide clear views to the tenancies along the active street frontage.

b. Incorporate principles of CPTED.

c. Incorporate a palette of high-quality design treatments and finishes consistent with Council public domain guidelines.

d. Landscaped area to be a maximum of 1m above the natural grounds' level of the streetscape.

e. Should be 24/7 publicly accessible.

f. Is deep soil and must include a combination of paving and high-quality landscaping.

g. Should have awnings at entries for tenancies. Continuous awnings can be considered by Council as long as the awnings do not clash with any trees within public domain or this setback.

h. Provide retaining walls:

- are only permissible perpendicular to the site boundary
- should be a maximum height of 1m.

- should be entirely located within the lot boundary of the development lot.
- Use a design and profile to meet Public Domain Guidelines in consultation with Council.
- Should consist of durable materials as agreed with Council.
- Have horizontal tops and minimal stepping.
- Enable casual seating where appropriate.

C.49 The Through Site Link is to:

a. Be provided centrally between O'Connell Street and Fleet Street to align with Harold Street centre line and to be minimum 12m wide.

b. Be a 24/7 publicly accessible pedestrian link.

c. Be designed to facilitate a future extension from O'Connell Street to Fleet Street. The proposed levels where is meets the adjoining site should be designed to meet the natural ground level.

d. Be open to the sky.

e. Be fully accessible and equitable with graded walkways no steeper than 1 in 20. Where the topography does not permit these walkways, alternatives must be proposed.

f. Provide trees in deep soil (preferably) or in set down slabs and planters to encourage and sustain large canopy trees consistent with ADG soil volumes, soil depth, irrigation, and sub-soil drainage.

g. Provide pedestrian lighting to ensure safe 24/7 access without reflecting into residential properties.

h. Incorporate principles of CPTED to support safety and security of users.

i. Ensure provision of set down slabs to enable a minimum soil depth of 1.2m plus associated drainage service and paving allowances, to enable large tree planting along it.

Awning Design

C.50 Awnings to be provided as specified in sections above and should comply with the design guidelines set in the Parramatta DCP

Vehicular Access and Parking

C.51 Basement access is to be from Albert Street

C.52 Basement carparking must be located predominately below existing ground level. Where slope conditions mean this is unachievable, the basement projection of the floor level of the storey immediately above is to be less than 1 metre above existing ground level.

C.53 Vehicular and bicycle parking rates are to be applied as per the table below:

Vehicular	Maximum Parking Rate
1 bedroom	0.6 per dwelling

2 bedroom	0.9 per dwelling
3 bedroom	1.4 per dwelling
4 bedroom	1.4 per dwelling
Visitor	1 space per 5 dwellings
Retail	1 pace per 30sqm
Commercial	1 space per 65sqm
Childcare	1 space for every 4 children
Bicycle	**Maximum Rate**
Bicycle	1 space per dwelling
Bicycle (visitors)	1 space per 10 dwellings
Bicycle (retail)	0.2 spaces per car parking space
Bicycle (childcare)	0.2 spaces per car parking space

DKO Architecture
Places designed for people
9 Albert St & 31 O'Connell St
North Parramatta NSW
Revised Urban Design Report
Response to Council's RFI
April 2024
DKO

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ISSUE	DATE	PREPARED BY	REVIEWED BY	COMMENT
1	17.11.23	KL/MJ	SO	
2	09.02.24	KL	SO	Response to Council's RFI

DKO recognises Aboriginal and Torres Strait Islander people as the Traditional Custodians of this land who have a deep historical and spiritual connection to Country, waterways, rivers and seas. We pay our respects to past, present and future ancestors of the Aboriginal and Torres Strait Islander community. We are committed to creating a place where people of all cultures are welcome, respected and have equal opportunity in the local community.

EXECUTIVE SUMMARY

Project Summary

The following Urban Design Report has been prepared by DKO on behalf of Peterose for the subject site, 9 Albert Street and 31 O'Connell Street, North Parramatta.

The broad objective of this proposal is to indicate how residential uplift can be achieved for this site following Council's precinct strategy, including:

- Increase to the maximum permissible FSR
- Increase to the maximum permissible building height

The purpose of this document is to provide an analysis of the urban context, current and future planning objectives for the site, and investigate the potential for what a built form might be.

The built-form proposal has led to a building envelope which is in keeping with Parramatta Council's desired future context and the SEPP65 ADG principles of design.

Vision and Development

This proposal aims to build upon and develop the aspirations and goals of the Parramatta North Urban Transformation Precinct. It addresses a key corner of this precinct, carefully considering the adjacent built form character, topography and environment. The subject site presents a prime opportunity for becoming a main intersection for people travelling from the North and North-East to Parramatta CBD. The proposed development aims to increase the vibrancy of the surrounding context by introducing well-designed, contemporary buildings that define and reinforce corner sites with continuous active retail street frontage in close proximity to the newly constructed light rail.

To date, Peterose has collaborated closely with Parramatta City Council to develop this planning proposal and is committed to contributing responsive and resilient amenities for the local government area.

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1
INTRODUCTION & BACKGROUND

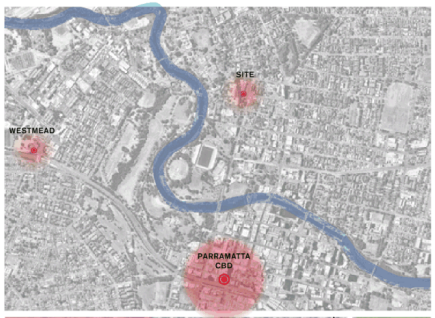
This proposal seeks to enhance and expand upon the vision and objectives of the Parramatta North Urban Transformation Precinct. Considering the neighbouring architectural style, landscape, and natural surroundings, it focuses on a pivotal area within this precinct.

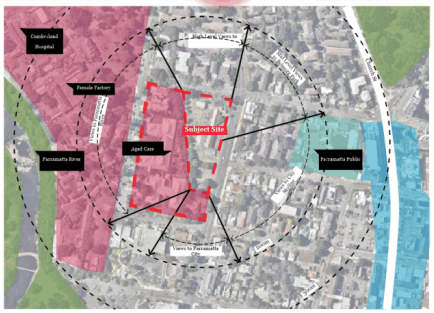
The selected location offers a unique opportunity to serve as a primary intersection for individuals commuting from the North and North-East to Parramatta's CBD. The proposed developments aim to increase the vibrancy of the surrounding context by introducing well-designed, contemporary buildings that define and reinforce corner sites with continuous active retail street frontage.

INTRODUCTION & BACKGROUND
SITE OVERVIEW

The subject site comprises 2 existing lots (1/-/DP1143431 & 1/-/DP998240) forming an 8,910m2 parcel at the corner of Albert and O'Connell Street in the heart of North Parramatta.

Located just 1km north of the Parramatta CBD and 1.8km east of Westmead, respectively, the site is a key centre in the western district as a transport and service hub providing significant housing and employment. Sitting at the heart of the western economic corridor, the area has rapidly evolved from historically a fine-grain, local centre to a large-scale, high-density, mixed-use strategic centre.





Key

- Health
- Commercial / Retail
- Education / Culture
- Public Open Space

INTRODUCTION & BACKGROUND
UNDERSTANDING OUR LAND

Aboriginal and Torres Strait Islander People

City of Parramatta acknowledges the Traditional Owners of this land, the Dharug people.

For over 60,000 years, the area comprising present day Parramatta has been occupied by the Burramattagal people, a clan of the Dharug, who first settled along the upper reaches of the Parramatta River. Burramattagal is thought to be derived from the Aboriginal word for 'place where the eels lie down' to breed (within the Parramatta River).

The Burramattagal have a close connection with the river, from which they caught fish, eels, and other food. Their stable, bark canoes often held a central small fire, built on a mound of soil, to cook up their fresh catch. 'Fire-stick farming', employed to burn vegetation to facilitate hunting and to change the composition of plant and animal species in the area, was also practiced by the Burramattagal people.

Soon after Governor Phillip's arrival with the First Fleet (of convicts from England) in 1788, Parramatta was developed as a farming settlement to feed the new English colony. This colonisation led to the immediate and tragic displacement of local First Nations people from the land that they had inhabited for thousands of years. Local Aboriginal groups led a resistance against the new settlers, with the most prominent warrior known as Pemulwuy.

The Dharug people still populate the areas of Parramatta, Greater Western Sydney, La Perouse and the Blue Mountains. There are a number of Dharug organisations and advisory committees that include active Dharug people,

Source: South west view of Parramatta in New South Wales by an unknown artist 1811

From Rose Hill to Parramatta

The settlement was originally known as Rose Hill in honour of George Rose, Secretary to the British Treasury, who was reputed to have helped Phillip secure appointment as governor of the penal colony. On 2 June 1791, Phillip renamed it Parramatta, using the locality name used by the Burramattagal. Various meanings have been ascribed to the name Parramatta, but Elizabeth Macarthur wrote at the time that it meant 'head of the river'. It was the first place to be given a name by Europeans that was based on an Aboriginal name.

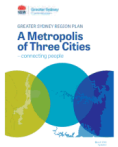
Government House was set up as the governor's Parramatta residence and a large area around it was set aside as the Governor's Domain. It became Parramatta Park after it had been greatly reduced in size. Until the 1850s many governors preferred to rule from Parramatta rather than Sydney.

Manufacturing in Parramatta included weaving, brewing, and brick kilns. The streets were regularised in 1811 and 1814. Inns emerged as commerce expanded in the town, changing a convict-based economy into a market-based economy.

Parramatta Female Factory

The Parramatta Female Factory is the largest and oldest surviving convict women's site in Australia. Built by convict men between 1818 and 1821, this multi-purpose institution served the colony of New South Wales until 1848 as a refuge for women, children, elderly and sick women; a marriage bureau; a place of assignment and moral reform; a penitentiary; a women's hospital for the convicted as well as the free; and a workhouse all rolled into one. Although this was the second Female Factory established at Parramatta, it was the first purpose built factory and the one on which all other Australian female factories were based. It is located approximately three kilometres north of the Parramatta CBD on 56 acres (approximately 23 hectares) of land currently occupied by Cumberland Hospital. The factory's surviving buildings are found off Greenup Drive and Fleet Street, North Parramatta in the Fleet Street Heritage Precinct, just five minutes walking distance from Parramatta Gaol with which it shares a long history.

Source: 1826 watercolour painting of the Parramatta Female Factory



Greater Sydney Region Plan: A Metropolis of Three Cities - connecting people

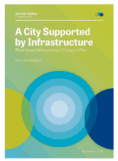
As the population of Greater Sydney is projected to grow to 8 million over the next 40 years, and with almost half of that population residing west of Parramatta, re balancing economic and social opportunities will leverage that growth and deliver the benefits more equally and equitably across Greater Sydney. Residents will have quick and easy access to jobs and essential services. Housing supply and choice will increase to meet the growing and changing needs of the community. The environment and precious resources will be protected. Importantly, infrastructure will be sequenced to support growth and delivered concurrently with new homes and jobs.

Central City District Plan

For the Central City District this includes radial transport links to and from Greater Parramatta, encompassing Parramatta CBD, Parramatta North and the Westmead health and education precinct, connected via Parramatta Park. Links to the north, south, east and west – and approved east-west connections – will increase the number of skilled workers who live within easy reach of Greater Parramatta.

Covering an area of more than 1,400 hectares, Greater Parramatta encompasses Parramatta CBD, Parramatta North and the Westmead health and education precinct, connected via Parramatta Park. It is the core of the Central River City. Greater Parramatta has a target of 55,000 new jobs by 2036. This requires new opportunities for medical and education services and associated commercial activities in Westmead, and greater commercial capacity in Parramatta CBD. The strong pressure for residential development in Parramatta CBD will need to be addressed to retain commercial capacity (refer to Planning Priority C10 for details on job targets).

Parklands associated with rivers and creeks, as well as street tree planting and the public spaces in the District's centres provide a diversity of landscapes. In recent years, the development of large office blocks in strategic centres has reinforced the need for quality design to enhance new skylines. Within the District's growth areas, vistas to historic colonialera homesteads have been protected through the planning and design process. View corridors around key sites in the Parramatta North Urban Renewal Area have also been protected.



A City Supported by Infrastructure

Greater Parramatta and Olympic Peninsula undergoes a step change in connectivity and becomes a 30-minute city.

- Benefit from high quality mixed development that creates new places to live, work, learn and do business.
- Accommodate 84,000 new homes and 105,000 new jobs over 20 years.
- Better connected with new light rail and metro services, creating a 30-minute city for people to access the places and services they need to get to.
- Benefit from the creation of a 'Green Grid' with new parks and links, irrigated with sustainable water sources.
- Become more sustainable with a new resource recovery facility to manage waste and supply recycled water to Parramatta CBD and Sydney Olympic Park.
- Well on a pathway to fully realise the GPOP vision.

Greater Parramatta and Olympic Peninsula - Our True Centre: the Connected Unifying Heart

GPOP has a diverse and growing economy, providing more than 150,000 jobs in Parramatta CBD and Westmead health and education precinct, advanced technology and urban services in Camellia, Rydalmere, Silverwater and Auburn, and the Sydney Olympic Park lifestyle precinct already more than 190,000 people call GPOP home.

Starting with the vision for GPOP: Our true centre: the connected, unifying heart, four scenarios over 10, 20 and 40 years were developed when we trialled the PIC model. Then different levels of jobs and housing growth with the infrastructure and services needed were tested under these scenarios. After comparing the costs and the benefits, the 'Transformative' scenario was chosen to develop a draft sequencing plan and proposed infrastructure priorities for GPOP, to help shape the area as it grows, starting with the next 10 years.

This work shows where new jobs and housing would most cost-effectively be delivered in GPOP, along with the infrastructure and services needed to deliver the most benefits for people and businesses.

INTRODUCTION & BACKGROUND
SETTING THE SCENE

Local Strategic Planning Statement

The Parramatta North Precinct provides an opportunity for a major new tertiary education campus in close proximity to both the Parramatta CBD and Westmead, and is also an opportunity to celebrate the area's rich heritage.

The City of Parramatta is on track to meet its job targets under the Central City District Plan, for its Strategic Centres (includes Parramatta CBD, Sydney Olympic Park and Epping). Support the establishment of a major new tertiary education campus at Parramatta North Precinct to deliver additional jobs.

- Investigate potential development controls to guide the adaptive re-use of heritage items in the Parramatta North Precinct, noting its National heritage significance.
- Work with the State Government to support a new major tertiary education facility at Westmead/Parramatta North Precinct to deliver additional jobs.
- Assist the State Government with precinct planning at Westmead, Parramatta North Precinct and Sydney Olympic Park and within the GPOP corridor.

Local Housing Strategy

The Strategy's Key Findings The key findings from the Strategy are as follows:

- Parramatta will easily achieve the dwellings targets identified in the District Plan.
- Most of Parramatta's growth is already 'locked-in' ('in-place' or 'in-train' within current growth precincts and planning proposals).
- No new or additional high density residential precincts or areas need to be identified for the purpose of housing supply.
- The majority of new housing growth (83%) will be delivered in 13 precincts (73% in GPOP area) around employment and transport.
- More 1 bedroom dwellings need to be delivered to meet anticipated demand.
- Lack of housing diversity across Parramatta – 70% of all dwellings in 2036 may be apartments (without intervention).
- Need to investigate more medium density housing types – terraces and townhouses in suitable locations including possible new precincts.
- Staged precinct release in line with infrastructure delivery (eg. Sydney Metro West and the Parramatta Light Rail Stage 2 or equivalent projects) which are at early planning or business case stages are key to unlocking further capacity.

Parramatta Employment Lands Strategy

The local economy is strong and diverse, based around three strategic areas: service based jobs based predominantly in the Parramatta CBD, health and medical activities and jobs with a strong concentration in the Westmead Health and Medical Precinct, and industrial related activities concentrated in employment lands.

Parramatta Council's employment lands will work as an integrated network to support the growth of the Parramatta CBD as Australia's next great city. They will provide for a diverse range of industrial activities and jobs and facilitate economic growth and prosperity. They will service broader metropolitan and global markets and supply chains and also serve the needs of the local catchment and growing population. Council will facilitate opportunities for urban renewal of its employment lands and priorities uses which generate new jobs and business development

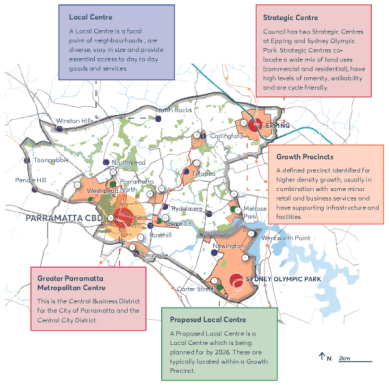
Parramatta North Urban Renewal Area State Significant Site

Urban Growth NSW submitted a State Significant Site study to the Department of Planning and Environment which included proposed changes to the Parramatta Local Environmental Plan 2011 and the Parramatta City Centre Local Environmental Plan 2007, a draft amendment to the Parramatta Development Control Plan 2011 and other relevant material.

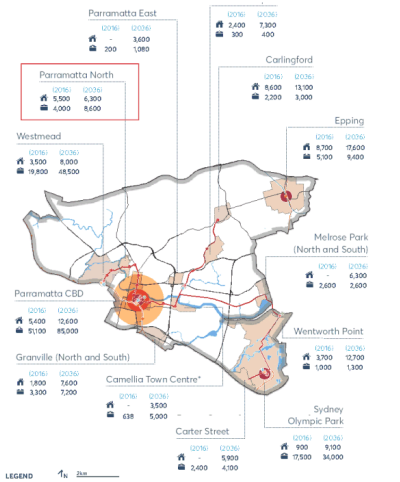
The key components of the exhibited proposal include:

- Cumberland Sub Precinct:
  - 4,400 dwellings
  - 28,000m2 GFA heritage reuse/adaption*
  - 4,000m2 GFA retail
- Sport and Leisure Sub Precinct
  - 34,000m2 GFA mixed use – mainly commercial
- 1,000 permanent jobs, 3,000 during construction
- Proposed building heights predominantly of 4, 6 and 8 storeys, also including 12, 14, 18, 20 and 30 storey buildings, generally on the eastern side of the subject site.

INTRODUCTION & BACKGROUND
SETTING THE SCENE



Source: Parramatta LSPS



Source: Parramatta LSPS

INTRODUCTION & BACKGROUND
DRIVERS FOR CHANGES

Jobs Growth

Greater Parramatta – the metropolitan centre – is the core of the Central River City. Greater Parramatta encompasses Parramatta CBD, North Parramatta and Westmead and Parramatta Park. Greater Parramatta's economy is centred on world-class health, education and research institutions as well as finance, business services and administration.

Greater Parramatta has the potential to reach 100,000 jobs over the next 20 years. The Government will work with Parramatta City Council to build and expanded Greater Parramatta by incorporating Westmead Parramatta North, Rydalmere and Camellia. The Government will work with Parramatta City Council to: grow Greater Parramatta by connecting and integrating the precincts which provide jobs, goods and services, including Parramatta CBD, Westmead, Rydalmere, Parramatta North and Camellia with the existing commercial core.

Urban Growth NSW developed a proposal to amend the planning controls which apply to parts of the Cumberland and Sport and Leisure sub precincts. The exhibited proposal sought to enable the following development yields:
Cumberland sub precinct:

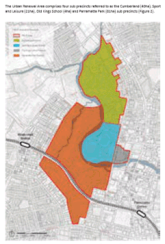
- Approximately 4,100 dwellings
- Approximately 20,000 gross floor area of adaptive reuse of heritage buildings*
- Up to 4,000 sqm of retail floor space

Urban Growth NSW has advised that the proposal will generate 1,000 permanent job and 3,000 jobs During the construction phase.

An Evolving and growing population

Parramatta is experiencing steady population growth. Over the past 10 years, the community has seen a growth in diversity with more people born overseas and speaking languages there than English.

Parramatta is experiencing steady population growth. Over the past 10 years, the community has seen a growth in diversity, with more people born overseas and speaking languages there than English.
This population growth, along with improved connectivity, is increasing demand for new and diverse housing types, including dwellings for larger households (couples with children and group households) and smaller households (couples with no children, single parents, single people). Meeting the Council's 2036 housing target for Parramatta will enable population growth with housing that meets the needs of different people at all stages of life..



Source:Parramatta North Urban Renewal Area State Significant Site

Demand for sustainability and resilience

Climate change contributes to increased frequency and intensity of extreme weather events, causing infrastructure failure and posing significant risks to people, property, the environment, and the economy. Parramatta's local climate is also getting hotter and more extreme.

Developments must play a role in reducing the adverse impacts of climate change through increased sustainability outcomes for residential and commercial development. Incentivising sustainable transport and increasing vegetation and tree canopy in open spaces and the public domain are paramount.

Source:Parramatta Lightrail Route Map

Move Better

The Parramatta Light Rail will connect Westmead to Carlingford via the Parramatta CBD and Camellia over 12 kilometres, with 16 stops. It will connect the Parramatta CBD to the Westmead Health Precinct, CommBank Stadium, the largest museum in NSW Powerhouse Parramatta, the Rosehill Gardens Racecourse and three Western Sydney University campuses at Westmead, Parramatta and Rydalmere. It will also traverse the Cumberland Precinct, the Camellia Town Centre, and Telopea's private and social housing redevelopment.

By 2026, around 28,000 people are expected to use the Parramatta Light Rail daily, with an estimated 130,000 people living within walking distance of the 16 light rail stops. This means Parramatta North is set to experience significant improvements in capacity, frequency and reliability of transport options and reduced car dependency. Unlocking the connectivity of Parramatta North will enable significant employment, education and housing growth and opportunities in the centre.

This investment needs to be further supported by improvements to local and regional bus networks and public transport services that connect Parramatta during the day and night. Improved active street connections to surrounding areas will also help encourage alternative transport choices.

2

CONTEXT ANALYSIS

BC20000-

ORIGINAL MOTHERLAND

The earliest known settlements on the land are the Wangal people, a clan of the Dharug.

The Parramatta River is deeply connected to the dreaming and traditions of the Wangal people, who are thought to have occupied the lands stretching from current-day Cockle Bay and Rose Hill for 20,000 years. The river is considered by the Wangal people to be a living entity and vital to day-to-day life

1798

COLONIAL SETTLEMENT

In 1798 the County of Parramatta Planning Scheme identified the area as a sensible area for industrial growth. As a result, commercial and light industrial buildings began emerging in the area.

2023

NOW + FUTURE

Currently, commercial centres across Sydney are diversified and transformed into mixed-use precincts, seeking to provide residential development close to public transport, employment, public open space and retail. This process is transforming commercial centres into vibrant and dynamic places to live, work and relax.

In November 2015, the NSW Government announced Parramatta to Olympic Park light rail. The proposed line will extend underground from the northwest and to the city. North Parramatta will benefit from new opportunities for office and health-based commercial uses with an increased population in the area.

CONTEXT ANALYSIS
PUBLIC TRANSPORT

The site serves as a pivotal junction connecting commuters through various modes of transportation. The Parramatta Light Rail is a vital component of the NSW Government's infrastructure expansion initiative, designed to enhance the accessibility of Greater Parramatta to other strategic centres. The initial phase, scheduled for commencement by 2023, will link Westmead to Carlingford via the Parramatta CBD and Camellia, spanning 12 kilometres and encompassing 16 stops. This will establish a direct connection between Parramatta CBD, the Westmead precinct, prominent cultural venues like Bankwest Stadium, the new Powerhouse Museum, and new university campuses within the Greater Parramatta region.

Within a 300-meter radius, users can access three conveniently located light rail stops. Furthermore, the site features a bus stop servicing multiple routes, further enhancing connectivity. This location presents a significant opportunity for increased population density and economic activity, supporting existing and potential new complementary uses. Moreover, it offers a short and convenient trip to Parramatta train station.

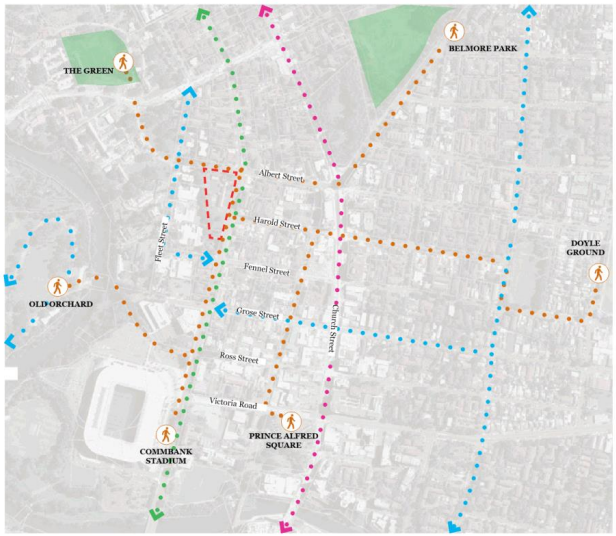
LEGEND:
- Subject Site
- Key Nodes Along Main Roads
- Light Rail Route
- Bus Stops
- Light Rail Route

CONTEXT ANALYSIS
WALKABILITY AND CYCLE ROUTES

The site is well situated, with several key neighbourhood amenities within easy walking distance.

Within a 10-minute walk, you'll find Commbank Stadium, several public parks, the picturesque Parramatta River, and the outskirts of the Parramatta Central Business District.

LEGEND:
- Subject Site
- Key Neighbourhood Amenities
- Main Pedestrian Movement
- Pedestrian Network
- On Road Bike Routes
- Off Road Bike Routes



CONTEXT ANALYSIS
LANDSCAPE

The site has good access to public parks and amenities with various spaces and uses within walking distance.

The PNUT masterplan connects to Parramatta Park, one of the largest public parks in the LGA. It also addresses the connection to green space and amenities along the Parramatta River.

Given the density and connection points through the precinct, there will be ample opportunity to develop landscape corridors and moments, which will aid in the broader connection of public space.

A landscape report has been prepared in conjunction with this report, which identifies the opportunities for the site and broader context in detail.

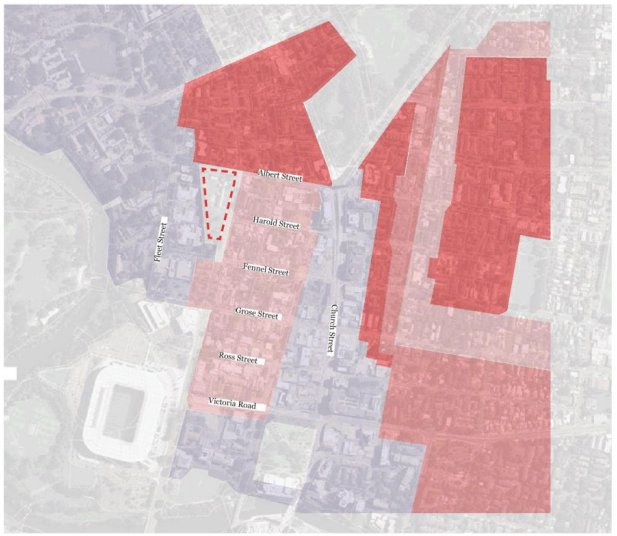
LEGEND:
- Subject Site
- Public Green Space

CONTEXT ANALYSIS
BUILT FORM

The subject site is surrounded by a mix of built-form typologies. Whilst the area has seen modest development over the 20th century, there is a relative amount of historic buildings from federation times which are nearby. A full heritage report has been prepared in conjunction with this report.

Currently, several larger nursing homes are to the west of the site. A mixture of commercial buildings can be found south of the site.

LEGEND:
- Subject Site
- High Density Residential
- Medium Density Residential
- Low Density Residential
- Mixed Use



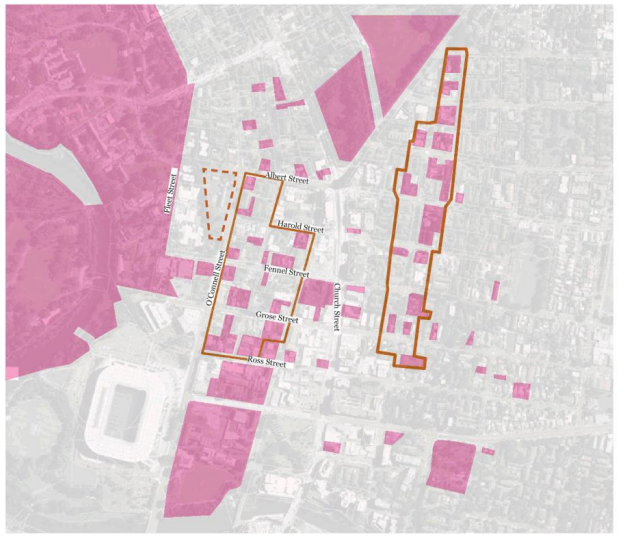
CONTEXT ANALYSIS
HERITAGE

North Parramatta is an area of early government subdivision in Parramatta dating from the 1820s. It retains many small dwellings and houses built from the mid-nineteenth century until the early twentieth century, the 1880s being the most intensive development period.

In the nineteenth and early twentieth century, this area was popular with the proprietors of businesses in Parramatta, and it retains much of its residential character from this period.

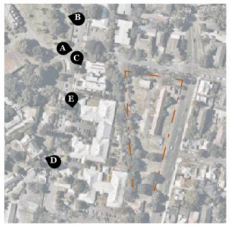
The predominance of small single-storey cottages on their own allotments reflects the character of Parramatta north of the river from the mid-nineteenth century until redevelopment for residential flats started in the 1960s. This area contains approximately 46% of the dwellings from 1895.

- Pattern of development from the nineteenth and early twentieth centuries of mostly small single-storey dwellings on their own allotments, in various forms and styles with front verandas, sited close to the street, together with a small number of larger houses with gardens.
- Residential flat buildings dating from the 1960s onwards, two to four storeys in scale with driveways and ground-level garages: these developments involved the amalgamation of two or more small allotments and demolishing small dwellings.
- Street pattern from the original government subdivision
- Stone kerbs and gutters and street trees
- Gardens/yards at the rear of small dwellings that are likely to retain old wells from the era before the installation of a town water supply
- Gently sloping landform



LEGEND:
- Subject Site
- Noted Architecture
- North Parramatta Conservation Areas

CONTEXT ANALYSIS
LOCAL CHARACTER



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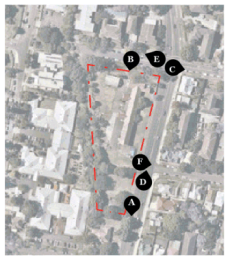
CONTEXT ANALYSIS
LOCAL CHARACTER



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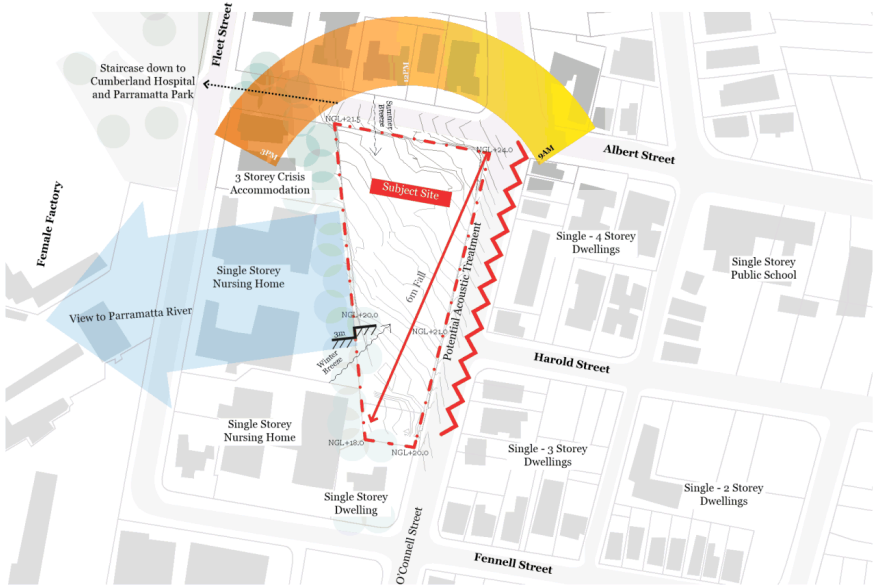
CONTEXT ANALYSIS
CONSOLIDATED SITE ANALYSIS



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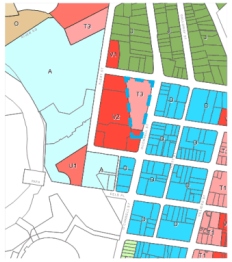
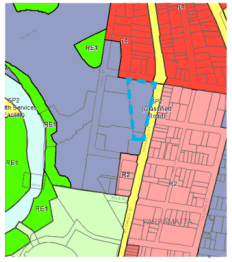
CONTEXT ANALYSIS
LEP

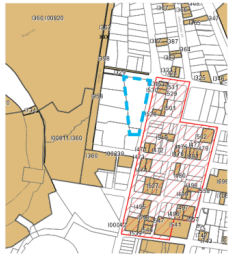


Floor Space Ratio Map - Sheet FSR_009

Height of Buildings Map - Sheet HOB_009



Land Zoning Map-Sheet LZN_009



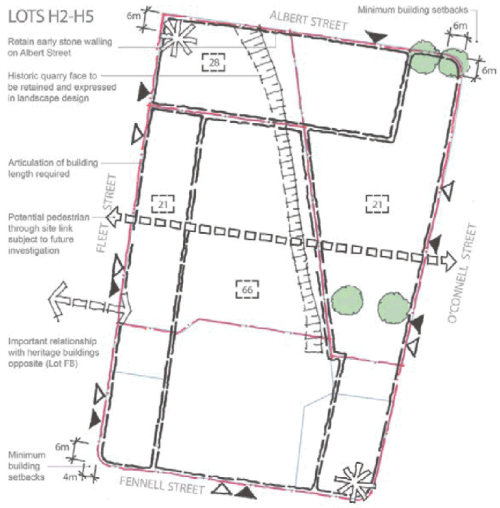
Heritage Map- Sheet HER_009

CONTEXT ANALYSIS
DCP

The western boundary of H3 is defined by an escarpment that drops c. 7 meters down to sites H2 and H4. Access from Albert and O'Connell Street is provided, with opportunity to provide a precinct wide through site link from east to west.

LEGEND:

- Subject Site
- Existing Cadastre
- Existing Trees to Be Retained Where Practicable
- PLEP 2011 Maximum Building Height (m)
- Minimum Building Setback
- Important Corner
- Preferred Building Address
- Preferred Parking/Service Access
- Important Relationship to Heritage Building
- Through Site Link



3
VISION

VISION

The precinct will be an attractive urban place for people to live in - a diverse, healthy, vibrant and sustainable new neighbourhood. Designed with 'place' in mind, the new community is underpinned by sustainability principles and high-quality public domain and built for outcomes.

To enable this vision, the precinct will deliver:

Improve street design for **Safe Walking and Cycling** to the light rail station.

Encourage Development near the station to boost public transport use.

Enhance the area's **Character** while preserving **Heritage** features.

Design around open spaces for better sunlight and tree growth

Promote Retail and attract people with green spaces and **Pedestrian-friendly** areas.

Fill gaps with new parks and improve access to **Green Spaces** for residents.

4

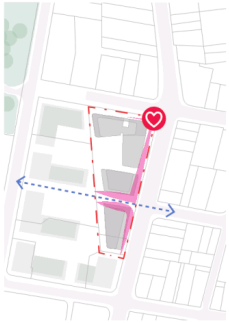
INTENSIFICATION

INTENSIFICATION PRINCIPLES

01 Providing safe and convenient walking through-site link continuation of Harold Street

02 Providing open spaces to meet the community's diverse and changing need, and to tie with future adjacent master plan

03 Providing active street edges for the retail needs of the local community



04 Providing housing supply, choice and affordability, with access to jobs, services and public transport

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5

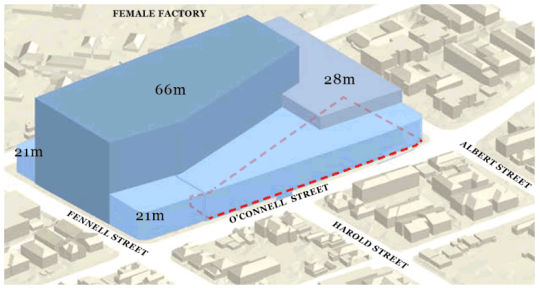
MASSING & BUILT FORM

MASSING & BUILT FORM
LEP HEIGHT CONTROL

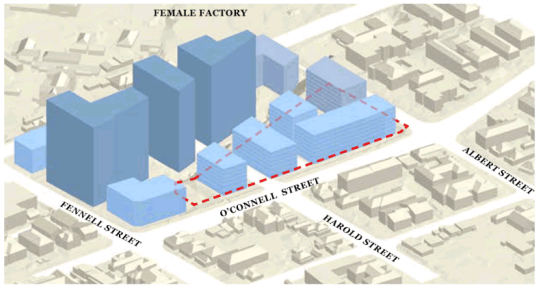
The current planning controls for the site and surrounding North Parramatta Urban Transformation Precinct was implemented via a State Environmental Planning Policy, that arose from the Urban Growth NSW work on the precinct.

The PNUT Precinct is a mixed use renewal precinct located adjacent to the Parramatta CBD. PNUT contains areas of unique heritage, landscaped spaces, and river settings. It is noted that the eastern edge of the precinct contains the core, a vibrant neighbourhood centre with a range of retail, commercial and residential uses serving existing and new local communities.

Building height on the subject site ranges from 21m to 28m, with a street main expression of 6 storeys.



Existing Height Control refer to Parramatta LEP

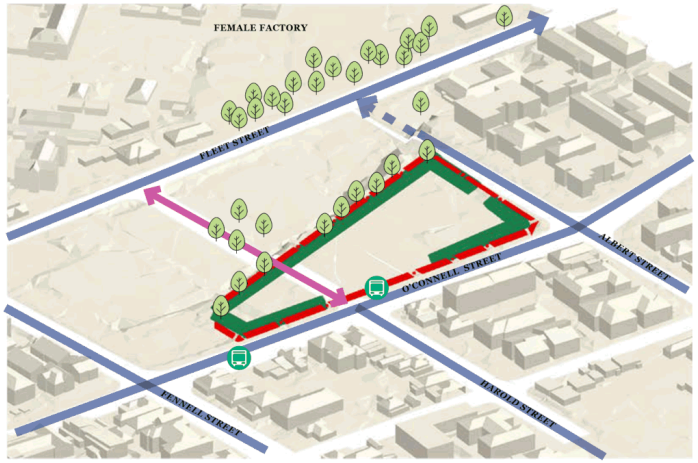


DCP Massing

MASSING & BUILT FORM
CONNECTION

The proposal acts as a gateway that allows for future connections through into the wider precinct.

Within the site, emphasis can be placed on enhancing internal links, while externally establishing a distinct connection to an upgraded pedestrian network spanning Fennell Street Harold Street & Albert Street, leading to Fleet Street, towards Female Factory site and Parramatta Park.



Legend:
- Subject Site
- Future Through-site Link
- Main Street
- Landscape Edge
- Bus Stops

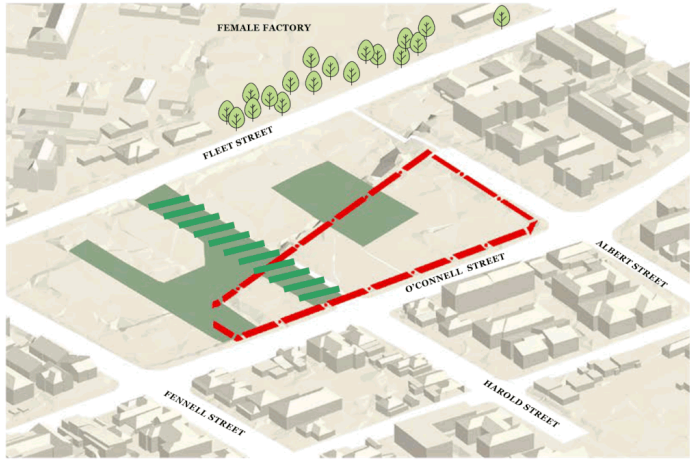
MASSING & BUILT FORM
GREEN CORRIDORS

Connecting Green

The through-site link not only seamlessly integrates the existing street to the east but also connects with the open space link to the west. This strategic linkage promotes enhanced connectivity along Harold Street and facilitates access to major heritage items located in the western part of the subject site.

In addition to fostering a east-west connectivity, the open space serves as a central hub for community engagement and recreational activities. Landscaped elements, seating areas, and pedestrian-friendly pathways contribute to a vibrant and inviting atmosphere.

Furthermore, the link between the open space creates a harmonious transition between built and natural environments, enhancing the overall aesthetic appeal of the master plan. This green corridor not only provides a visual respite but also encourages sustainable practices and biodiversity within the urban fabric.



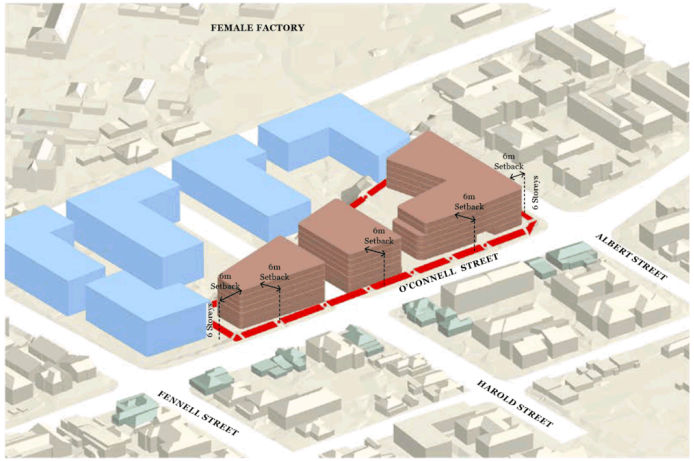
Legend:
- Subject Site
- Open Green Space
- Through Site Link

MASSING & BUILT FORM
RESPONSE TO STREETSCAPE

The stepped and undulation nature of the heritage frontages of O'Connell Street offer a relationship to the built form within the site. An extrapolated yet responsive approach can be adopted to assist in translating the two competing rhythms. Built forms can push and pull to complement and contrast the existing streetscape.

Towers are expressed above 6 storey podiums, which define public and communal spaces.

A minimum 6 metre building setback to Albert, O'Connell and Fennel Streets is to be provided.



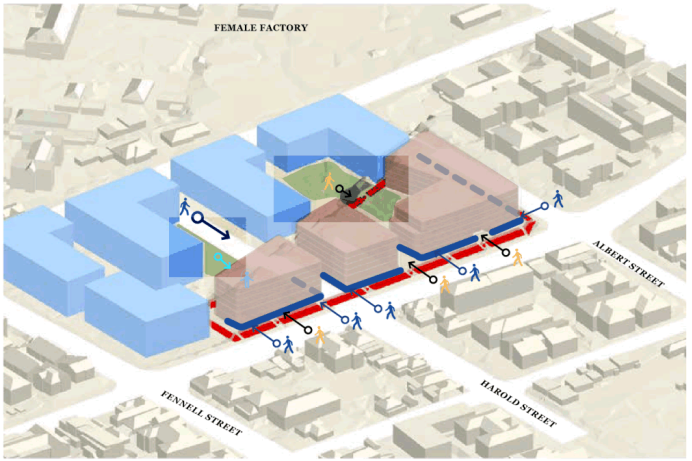
Legend:
- Subject Site
- Potential Future Developments(Podium)
- Potential Future Developments on the Subject Site (Podium)

MASSING & BUILT FORM
STREET ACTIVATION

The retail frontage and public through-site link contribute to the creation of an active ground plane.

An open space featuring restaurant, cafes, and special retail services seeks to create a vibrant destination. This, in turn, promotes other non-residential uses on the site.

The proposed childcare use and multiple lobby entries seeks to draw foot traffic from surrounding streets. This porosity assists in promoting clear and safe movement through the neighbourhood.



Legend:
- Subject Site
- Active Frontage
- Open Space
- Public
- Private
- Childcare

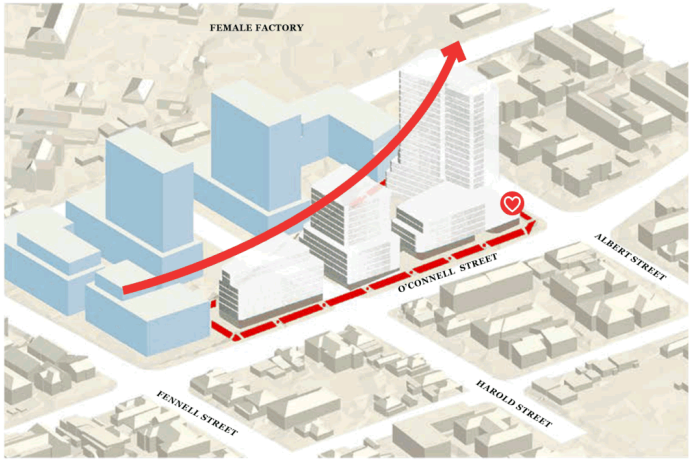
MASSING & BUILT FORM
HEIGHT

The proposed development has taken into consideration the following principles of the Parramatta Urban Transformation study.

- Concentration height in the north-east part of the precinct,
- Providing an appropriate scale of development along O'Connell Street, and
- Form a key corner to the precinct.

In this regard the planning proposal seeks a modest increase to the height along O'Connell Street and Albert Street and the reinstatement of the tower building on the northern edge of the site.

At the same time a more dynamic tiered approach to the eastern side of the precinct can form a suitable representation to the O'Connell Street and the associated Heritage Conservation Area.



Legend:

Subject Site

Potential Future Developments

MASSING & BUILT FORM
MASSING SEPARATION

Building separations have been provided as below:

Up to four storeys :

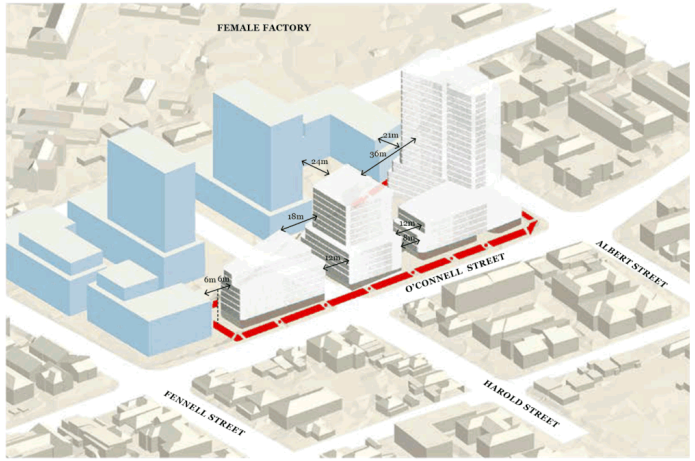
- 12m between habitable room/balconies

Five to eight storeys:

- 18m between habitable rooms/balconies

Nine storeys and above:

- 24m between habitable rooms/balconies



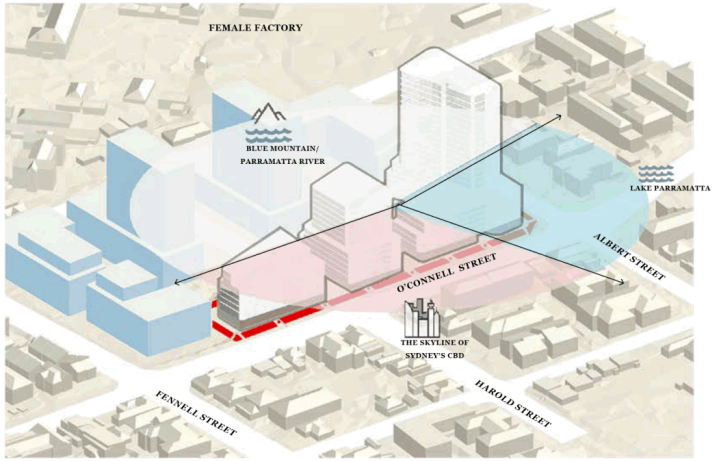
Legend:

Subject Site

Potential Future Developments

MASSING & BUILT FORM
ORIENTATION

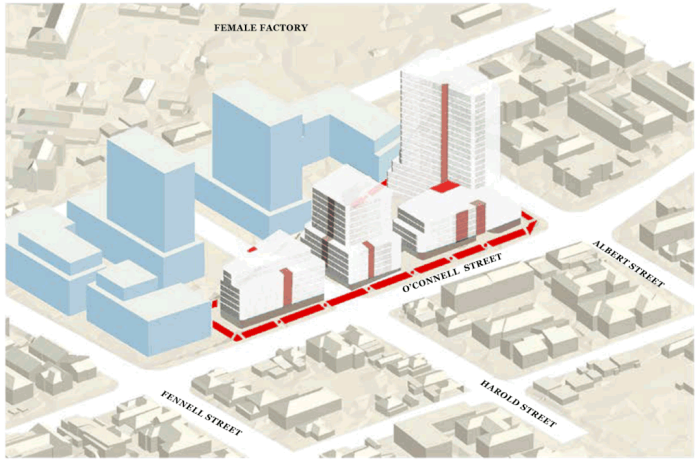
The proposal continues to provide good vistas and sight-lines both to and from the site. Clear views through the main through site link can be provided to increase legibility across the precinct.



Legend:
- Subject Site
- Potential Future Developments
- Mid to High Level Views Towards Lake Parramatta
- Mid to High Level Views Towards Lake Parramatta/The Skyline of Sydney's CBD
- Female Factory/Parramatta River, and the Blue Mountains Beyond

MASSING & BUILT FORM
ARTICULATION

Coupled with appropriate setbacks, the potential for articulation within each built form assists in responding to the character of the street and to reduce perceived bulk and scale. This language can assist in an optimized outlook and amenity for apartments.



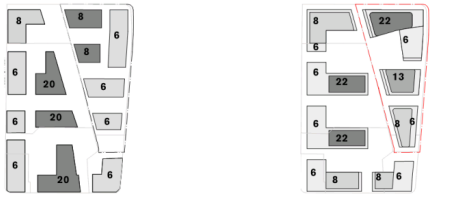
Legend:
- Subject Site
- Facade Breakup

ARTIST'S IMPRESSION

6

BUILT FORM JUSTIFICATION

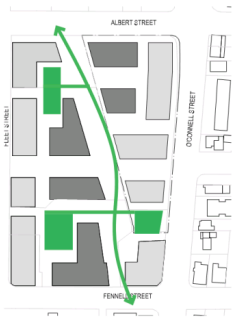
BUILD FORM JUSTIFICATION
DESIGN EVOLUTION



BUILD FORM JUSTIFICATION
CONSOLIDATION OF COMMUNAL OPEN SPACE

The concept of land porosity is integral to the proposal, functioning as a gateway that not only facilitates present connections but also strategically opens avenues for future linkages throughout the wider precinct.

Internally, a north-south visual connection can be accentuated, fostering seamless movement within the development.



DCP Master Plan

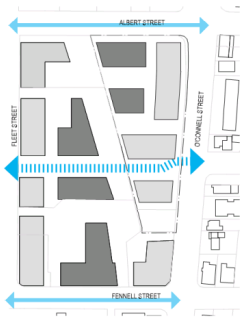
- Potential north-south communal connection linked to pocket gardens

Proposed Master Plan

- Large Communal space opens to perimeter block

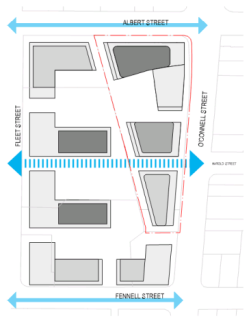
BUILD FORM JUSTIFICATION
BETTER CONNECTION

The proposal establishes a clear and accessible connection to an enhanced pedestrian network along Fennell Street, Harold Street, and Albert Street, extending down to Fleet Street. This network further extends towards significant landmarks, including the Female Factory site and Parramatta Park, promoting a cohesive and integrated urban fabric.



DCP Master Plan

- Provide a east west through site link
- Connect Harold street to Fleet Street and Female Factory Site



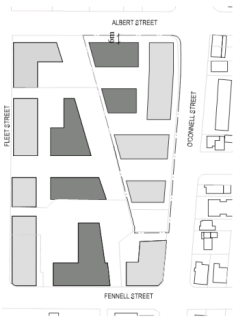
Proposed Master Plan

- Align a 12-meter through-site link with the centerline of Harold Street.

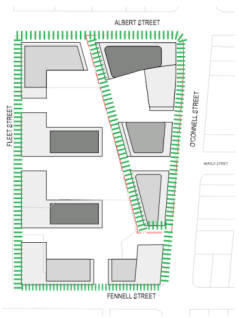
BUILD FORM JUSTIFICATION
SETBACK

To mitigate the visual impact of the development on the heritage area, a generous 6-meter landscape edge will be provided, seamlessly blending the built environment with the natural surroundings.

The setback zone allows for the possibility of incorporating deep soil zones, providing an opportunity for enhanced landscaping and greenery within the development, contributing to a more sustainable and aesthetically pleasing urban environment. Additionally, the 6-meter setback aligns with the intent of neighboring future plans, fostering a cohesive and harmonious integration with the surrounding community.



DCP Master Plan

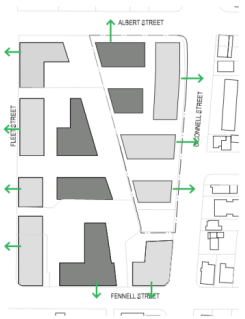


Proposed Master Plan

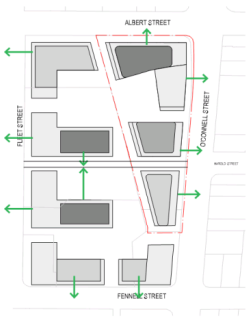
- Provide a 6m landscape edges to mitigate massing impacts to the heritage area
- Potential deep soil zone within setback

BUILD FORM JUSTIFICATION
DIRECT STREET ADDRESS

The new master plan will have a perimeter block arrangement & all buildings are having direct street address



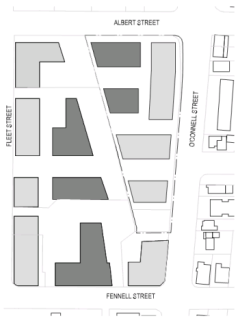
DCP Master Plan



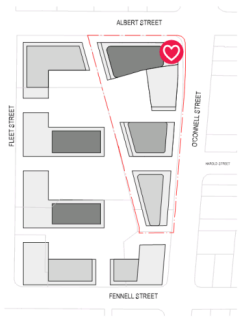
Proposed Master Plan

BUILD FORM JUSTIFICATION
MAIN SITE CORNER

In response to the current urban development, the new masterplan address the main site corner of Albert Street and O'Connell Street.



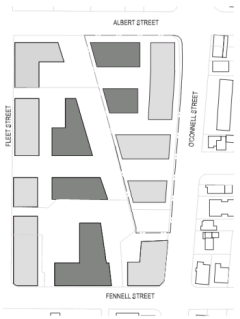
DCP Master Plan



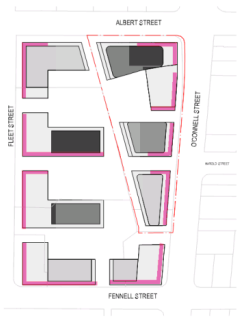
Proposed Master Plan

BUILD FORM JUSTIFICATION
ACTIVE EDGE

All buildings have a direct street address, maximizing the potential for creating additional retail or commercial space on grade.



DCP Master Plan

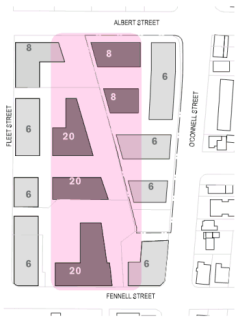


Proposed Master Plan

BUILD FORM JUSTIFICATION
MASSING DISTRIBUTION

The overall presentation to O'Connell Street is maintained whilst providing a dynamic activated frontage.

Additional height is setback into the site, with a unified and rhythmic approach at the street.



DCP Master Plan

- 20 storeys in the middle with 6-8 storeys on the east and west edges

Proposed Master Plan

- Large internal courtyard opens to perimeter block
- Blocks now deliver consolidated density with better opportunity for decent habitable space.

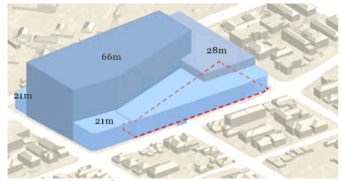
BUILD FORM JUSTIFICATION
HEIGHT DISTRIBUTION

The overall presentation to the street frontage is maintained while creating a dynamically activated frontage. Additional height is set back into the site, following a unified and rhythmic approach at elevation.

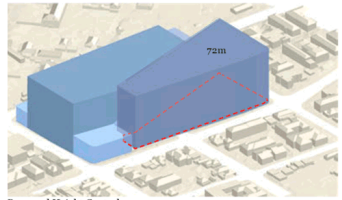
The stepped mass of the height portion of the blocks helps to push the mass into the site. This allows for a reduced scale fronting O'Connell Street while still serving as a beacon for the retail precinct below within the urban landscape.

Legend:

- 72m
- 66m
- 28m
- 21m
- Subject Site



Existing Height Control



Proposed Height Control

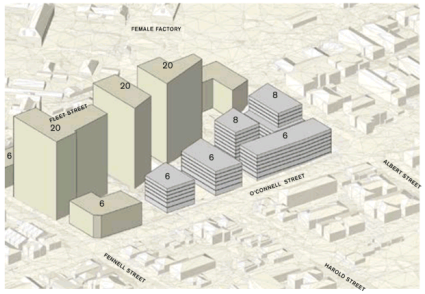
BUILD FORM JUSTIFICATION
HEIGHTS IN STOREYS

In harmony with the natural slope of the ground, the proposed design aims for a gradual descent from Albert Street to Fennell Street, creating a rhythmic transition.

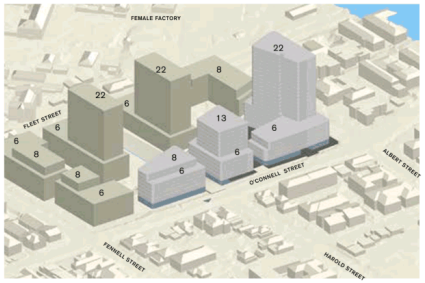
DCP Master Plan

Proposed Master Plan

BUILD FORM JUSTIFICATION
FROM COUNCIL PP MASTER PLAN TO AMENDED

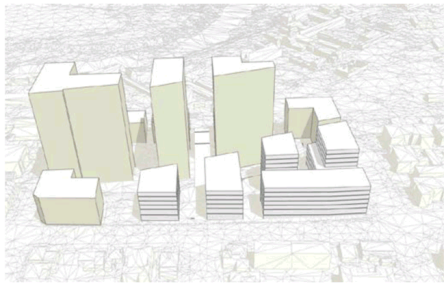


DCP Master Plan

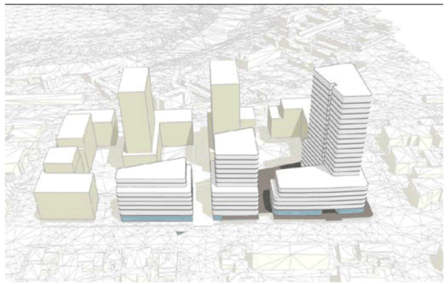


Proposed Master Plan

MASSING & BUILT FORM
MASSING COMPARISON

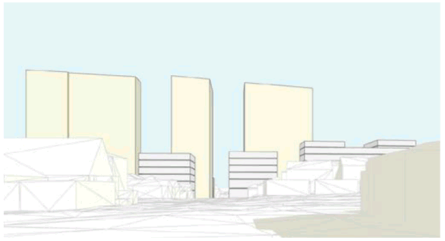


DCP Massing



Proposed Massing

MASSING & BUILT FORM
MASSING COMPARISON



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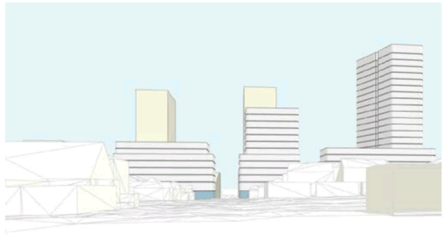
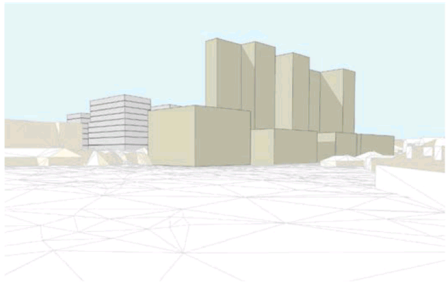


Proposed Massing

MASSING & BUILT FORM
MASSING COMPARISON



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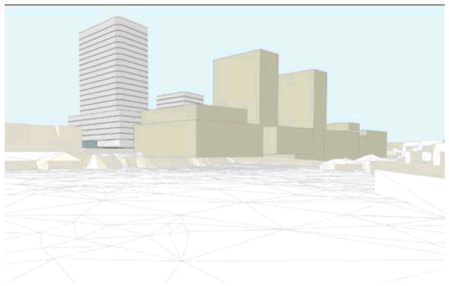

Proposed Massing

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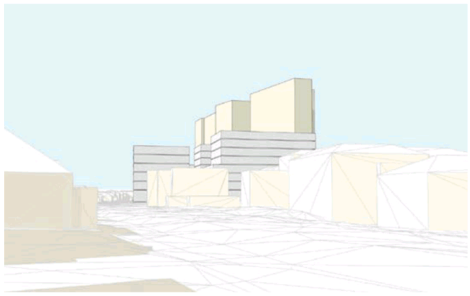
MASSING & BUILT FORM
MASSING COMPARISON



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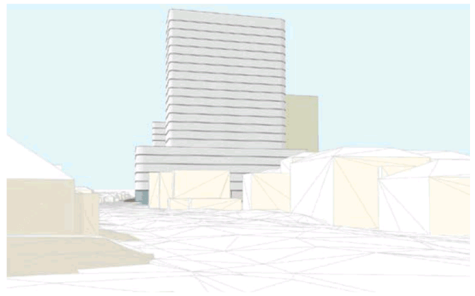

Proposed Massing

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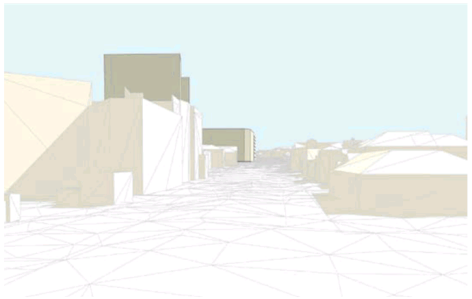
MASSING & BUILT FORM
MASSING COMPARISON



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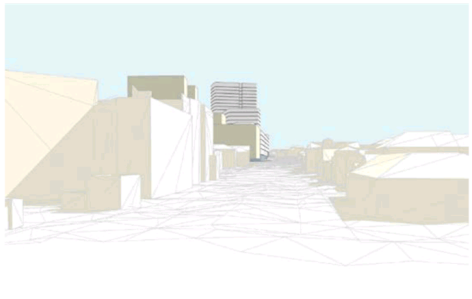

Proposed Massing

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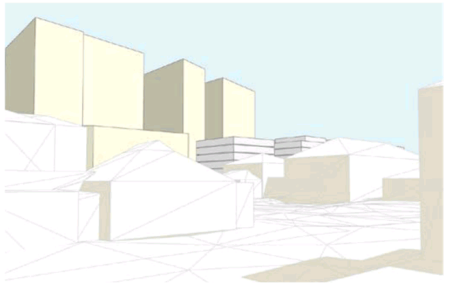
MASSING & BUILT FORM
MASSING COMPARISON



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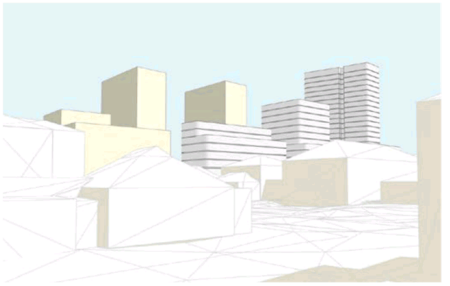

Proposed Massing

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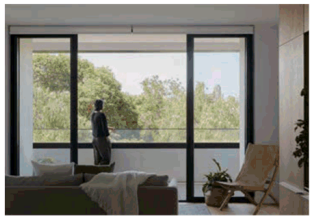
APPENDIX

INDICATIVE CONCEPT

INDICATIVE CONCEPT
VIEW ORIENTATION AND PRIVACY TREATMENT



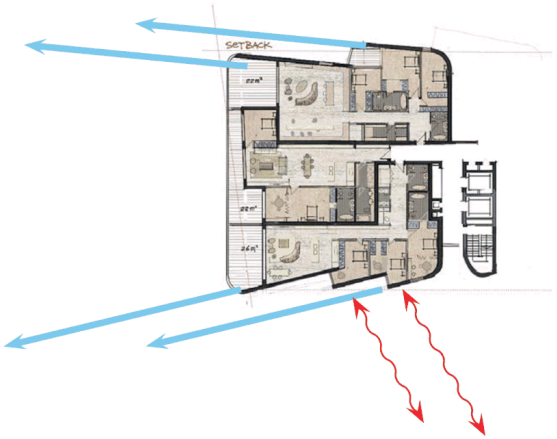
Internal view out from living area

Internal view out from bedroom

Key:

Direct Views

Visual Separation



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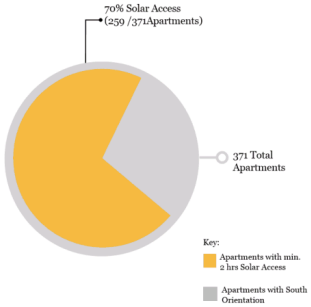
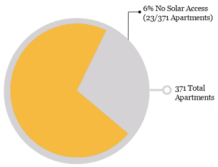
INDICATIVE CONCEPT
SOLAR ACCESS

Residential Solar Access

The proposed development is designed to provide the maximum amenity to a majority of the dwellings, with most units having northern aspect. The proposal maximises the daylight to each unit. 74% of all units that achieve minimum 2 hours of sunlight into living room windows between 9 am and 3 pm during mid winter, complies with constraints outlined in the ADG and no more than 6% of units are considered single aspect south facing.

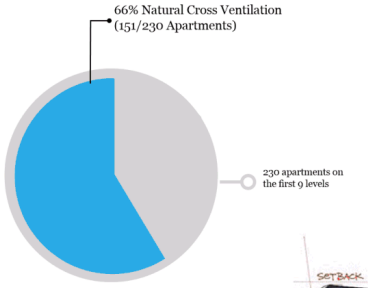




INDICATIVE CONCEPT
CROSS VENTILATION

Natural Cross Ventilation

A well-thought-out design understands that environment and buildings should work together, creating a sustainable and harmonious system. This design not only enhances indoor air quality but also promotes a comfortable and energy-efficient environment. By harnessing natural breezes, cross ventilation reduces the need for artificial cooling systems, creating a more sustainable and pleasant living space for residents.
65% of the apartments on the first 9 levels achieves natural cross ventilation, complies with constraints outlined in the ADG.



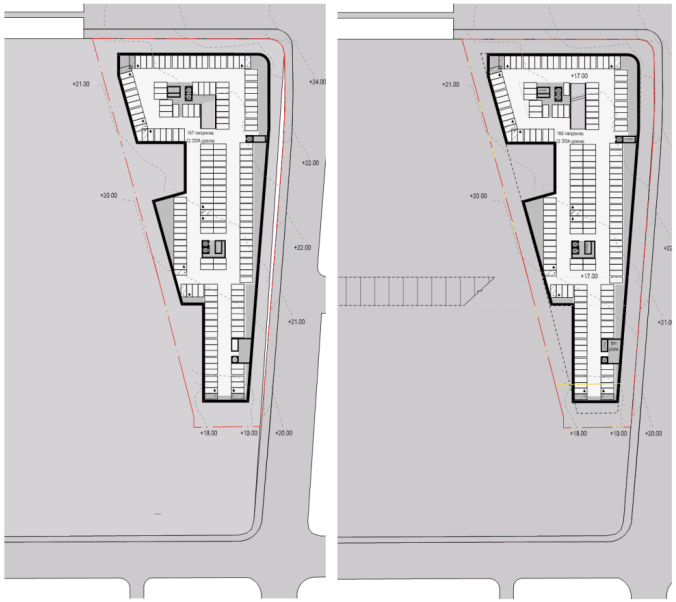
Building C
Typical Building End Condition

INDICATIVE CONCEPT
BASEMENTS

A typical basement layout with total of 440 car space allocated in two and half levels.

a 26m x 22m commual garden and 6 metres setbacks along the site boundaries provide deep soil allowance towards playground and landscape buffer areas.

A traffic report accompanies this



BASEMENT 02 BASEMENT 01

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INDICATIVE CONCEPT
LOWER GROUND

An indicated lower ground plane scenario which depicts a mix-used presentation to the public domain.

Corner safe, F/B and Child care centre help activate the centred green space and through site link.

Non-residential parking can be placed behind the active through site link frontage with control points giving security to residential parking.

Please refer to lanscpae report for further detail on COS

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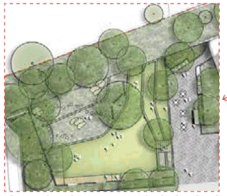
INDICATIVE CONCEPT
UPPER GROUND

A single point of entry from Albert Street helps seperate the retail and residential use on ground,

6 metres landscaped paving area, with continual awning covered,along the O'connell Street frontage, provide pedestrian amenities, and also encourage retail use.



Please refer to lanscpae report for further detail on COS

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INDICATIVE CONCEPT
PODIUM

An indicative residential podium layout, which shows utilises a urban village style of housing typology and with housing facing the communal open space. these external areas provide opportunity for protected but generous amenity for residents of multiple blocks.

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INDICATIVE CONCEPT
TOWERS

An indicative residential floor plate has been designed to demonstrate the potential for a diverse mix of occupancy types, ensuring appropriate separation, desirable outlooks, and natural amenities.

A landscape report, prepared in conjunction with this document, provides additional details on podium landscape opportunities, supporting a comprehensive understanding of the proposed outdoor spaces.

MID TOWER

UPPER TOWER

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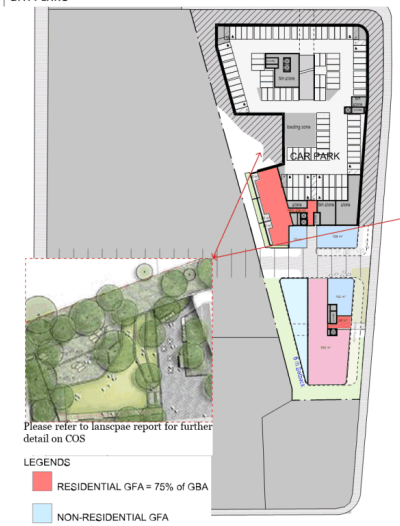
INDICATIVE CONCEPT
GFA PLANS



Please refer to lanscpae report for further detail on COS

LEGENDS

RESIDENTIAL GFA = 75% of GBA

NON-RESIDENTIAL GFA

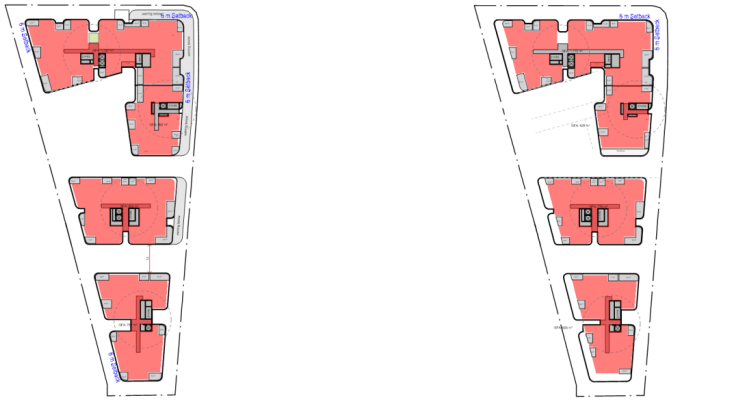
CHILDCARE GFA

LOWER GROUND

UPPER GRC

DKO ARCHITECTURE | THINK PLANNERS | CLIENT PETEROSE | 9 Albert Street & 31 O'Connell Street | PROJECT 13070 | URBAN DESIGN REPORT REVISION 2 | 10.11.2023 PAGE 71

INDICATIVE CONCEPT
GFA PLANS



LEGENDS

RESIDENTIAL GBA

RESIDENTIAL GFA = 75% of GBA

LOWER PODIUM UPPER PODIL

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INDICATIVE CONCEPT
GFA PLANS

LEGENDS

RESIDENTIAL GBA

RESIDENTIAL GFA = 75% of GBA

MID TOWER UPPER TOW

DKO ARCHITECTURE | THINK PLANNERS | CLIENT PETEROSE | 9 Albert Street & 31 O'Connell Street | PROJECT 13070 | URBAN DESIGN REPORT REVISION 2 | 23.04.2024 PAGE 73

INDICATIVE CONCEPT
DEEP SOIL

LEGENDS

DEEP SOIL AREA:2,657 m² =30% OF THE SITE AREA

ADG:MIN.DEEP SOIL AREA >7% OF THE SITE AREA

PDCP:MIN.DEEP SOIL AREA >30% OF THE SITE AREA

LOWER GROUND

UPPER GROUND

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INDICATIVE CONCEPT
LANDSCAPE

LEGENDS

LANDSCAPE ON GROUND = 3,978 m² =45% OF THE SITE AREA

LANDSCAPE (PODIUM INCLUDED) = 4,183 m² =47% OF THE SITE AREA

PDCP:MIN.LANDSCAPE AREA >40% OF THE SITE AREA

LOWER GROUND

UPPER GROUND

DKO ARCHITECTURE | THINK PLANNERS | CLIENT PETEROSE | 9 Albert Street & 31 O'Connell Street | PROJECT 13070 | URBAN DESIGN REPORT REVISION 2 | 10.11.2023 PAGE 75

INDICATIVE CONCEPT
COMMUAL OPEN SPACE

UPPER GROUND PODIUM ROOFTOP

LEGENDS

COMMUAL OPEN SPACE AREA:3,752 m²
=42% OF THE SITE AREA
10m² PER UNIT

ADG:MIN.COMMUAL OPEN SPACE AREA
>25% OF THE SITE AREA

PDCP:MIN.10m² PER UNIT (>3,700 m²)

Deep Soil Area

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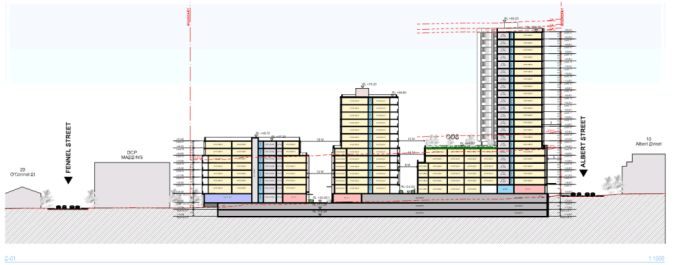
INDICATIVE CONCEPT
STREET ELEVATIONS

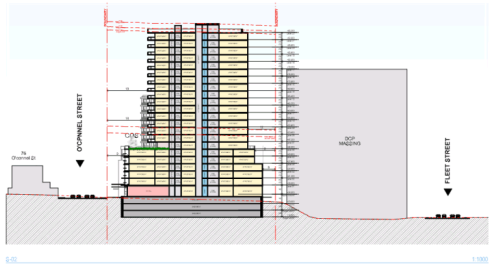
DKO ARCHITECTURE | THINK PLANNERS | CLIENT PETEROSE | 9 Albert Street & 31 O'Connell Street | PROJECT 13070 | URBAN DESIGN REPORT REVISION 2 | 23.04.2024 PAGE 77

INDICATIVE CONCEPT
STREET ELEVATIONS

DKO ARCHITECTURE | THINK PLANNERS | CLIENT PETEROSE | 9 Albert Street & 31 O'Connell Street | PROJECT 13070 | URBAN DESIGN REPORT REVISION 2 | 23.04.2024 PAGE 78

INDICATIVE CONCEPT
STREET SECTIONS





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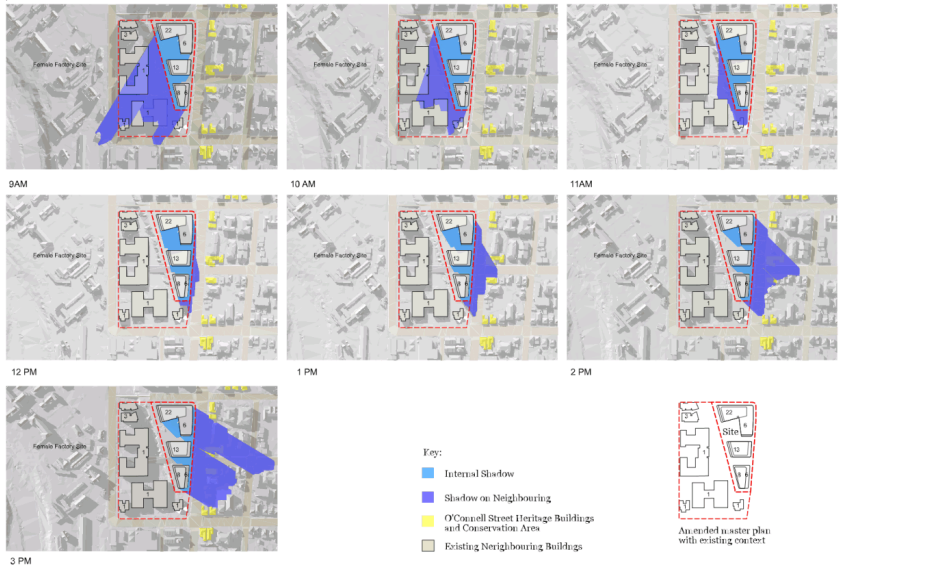
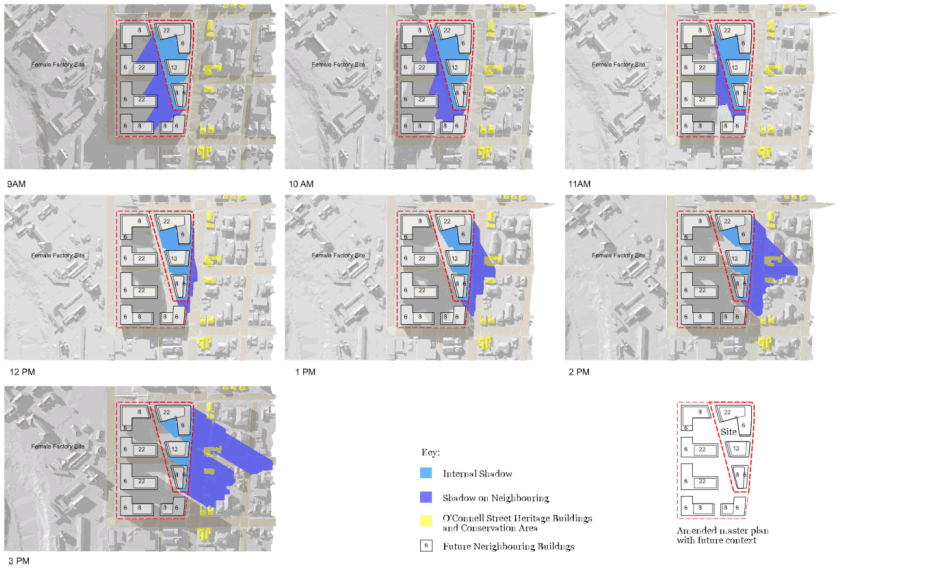
MASSING & BUILT FORM
SHADOW IMPACT ON EXISTING NEIGHBOUR_21ST OF JUNE 2023



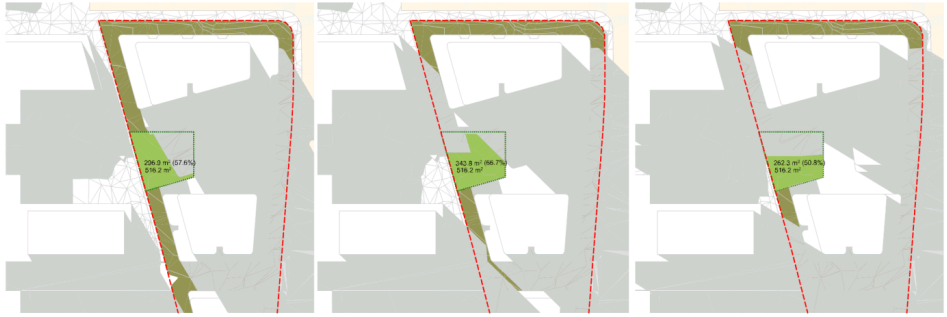
DKO ARCHITECTURE | THINK PLANNERS | CLIENT PETEROSE | 9 Albert Street & 31 O'Connell Street | PROJECT 13070 | URBAN DESIGN REPORT REVISION 2 | 23.04.2024 PAGE 80

MASSING & BUILT FORM
SHADOW IMPACT ON FUTURE DEVELOMENTS_21ST OF JUNE 2023



DKO ARCHITECTURE | THINK PLANNERS | CLIENT PETEROSE | 9 Albert Street & 31 O'Connell Street | PROJECT 13070 | URBAN DESIGN REPORT REVISION 2 | 23.04.2024 PAGE 81

MASSING & BUILT FORM
SHADOW IMPACT ON PRINCIPLE COS_21ST OF JUNE 2023



1 PM

solar on principal communal open space: 296.9 m² (57.6%)
principal communal open space area: 516.2 m²

2 PM

solar on principal communal open space: 343.8 m² (66.7%)
principal communal open space area: 516.2 m²

3 PM

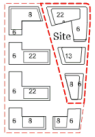
solar on principal communal open space: 262.3 m² (50.8%)
principal communal open space area: 516.2 m²

ADG 3D.1.2:

Developments achieve a minimum of 50% direct sunlight to the principal usable part of the communal open space for a minimum of 2 hours between 9 am and 3 pm on 21 June (mid winter)

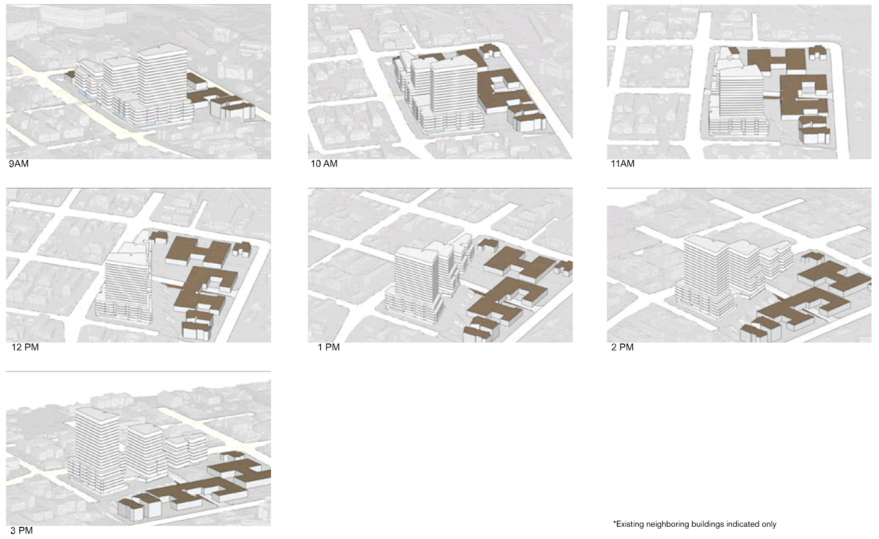
Key:

- solar on deep soil area
- solar on principal communal open space
- principal communal open space



Amended master plan with future context

MASSING & BUILT FORM
EYE OF THE SUN DIAGRAMS_EXISTING SURROUNDING_21ST OF JUNE 2023



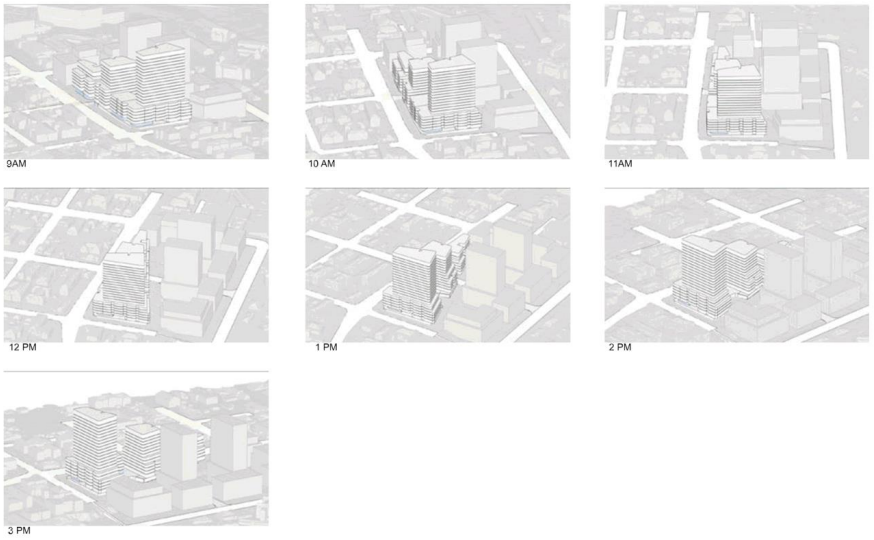
9AM | 10 AM | 11AM

12 PM | 1 PM | 2 PM

3 PM

*Existing neighboring buildings indicated only

MASSING & BUILT FORM
AMENDED MASSING EYE OF THE SUN DIAGRAMS_WITH FUTURE DEVELOPMENTS_21ST OF JUNE 2023



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MASSING & BUILT FORM
PUBLIC DOMAIN PHOTOMONTAGE

PROPOSED DEVELOPMENT

EXISTING CONDITION

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MASSING & BUILT FORM
PUBLIC DOMAIN PHOTOMONTAGE
HOSTORIC VIEW NO. 24
PARRAMATTA NORTH HISTORIC SITES CONSOLIDATED CONSERVATION MANAGEMENT PLAN

PROPOSED DEVELOPMENT

EXISTING CONDITION

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MASSING & BUILT FORM
PUBLIC DOMAIN PHOTOMONTAGE

PROPOSED DEVELOPMENT

EXISTING CONDITION

DKO ARCHITECTURE | THINK PLANNERS | CLIENT PETEROSE | 9 Albert Street & 31 O'Connell Street | PROJECT 13070 | URBAN DESIGN REPORT REVISION 2 | 23.04.2024 PAGE 87

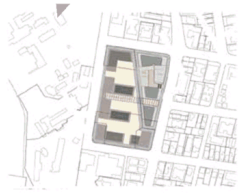
MASSING & BUILT FORM
PUBLIC DOMAIN PHOTOMONTAGE

PROPOSED DEVELOPMENT

EXISTING CONDITION

DKO ARCHITECTURE | THINK PLANNERS | CLIENT PETEROSE | 9 Albert Street & 31 O'Connell Street | PROJECT 13070 | URBAN DESIGN REPORT REVISION 2 | 23.04.2024 PAGE 88

MASSING & BUILT FORM
PUBLIC DOMAIN PHOTOMONTAGE



PROPOSED DEVELOPMENT

EXISTING CONDITION

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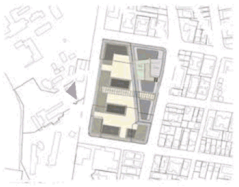
MASSING & BUILT FORM
PUBLIC DOMAIN PHOTOMONTAGE
HOSTORIC VIEW NO.23
PARRAMATTA NORTH HISTORIC SITES CONSOLIDATED CONSERVATION MANAGEMENT PLAN



PROPOSED DEVELOPMENT

EXISTING CONDITION

ADJACENT SITE AMENITIES
BUILDING SEPARATION AND VIEWS

The overall master plan aims to improve the arrangement of towers and communal open spaces to optimize views of the river and enhance visual separation between buildings.

Key:
- Building Separation
- Low-Level View
- High-Level View

INDICATIVE CONCEPT
YIELD TABLE

Retail GFA: 1,483 m²
Total Units: 371
Unit mix: 1bed 25.6%
2beds 60.9%
3/4beds 13.2%

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INDICATIVE CONCEPT
MATERIALS AND FINISHES_CONTEXT INSPIRATION

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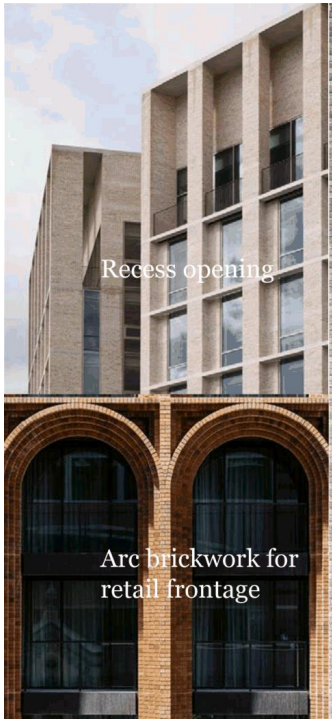
Black
windowframe

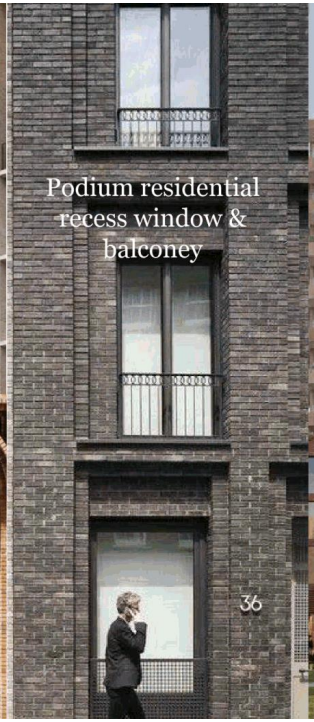
Ground retail with
awning

Lower precast
concrete

Recess painting
dark grey

PRECASTE CONCRETE
BEIGE FINISH
WINDOW FRAME
POWERCOATING
PRECASTE CONCRETE
CORNER PODIUM
BRICK MOWBRAY GREY
PODIUM RECESS
PAINTED DARK GREY


Recess opening
Arc brickwork for retail frontage


Podium residential recess window & balconey
36

Ground retail with awning

INDICATIVE CONCEPT
SOUTH EAST AERIAL VIEW
PODIUM BRICKWORK_GREY
CORTEN STEEL PANEL
CONCRETE WALKWAY UP TO COS
SETBACKED TOP LEVELS
METAL PANEL_ BLACK FINISES
PODIUM BRICKWORK_BROWN

INDICATIVE CONCEPT
MATERIALS & FINISHES

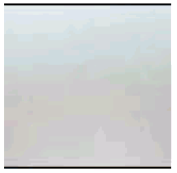
BUILDING RECESS/ PLANTROOM

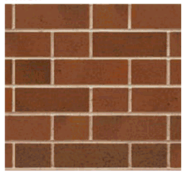
PRECASTE CONCRETE PAINTED GREY

PRECASTE CONCRETE

PRECASTE CONCRETE BEIGE FINISH

DULUX ELECTRO BLACK ACE METAL PANEL/WINDOW FRAME/HANDRAIL


TOWER GLAZING_CLEAR


BRICK_BOWRAL GERTRUDIS BROWN

BRICK_MOWBRAY_GREY

CORTEN STEEL PANEL

Page 98

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Planning Proposal

9 Albert Street and 31 O'Connell Street North Parramatta

Revised Heritage Assessment: 08 May 2024

Background

An initial proposal was developed responding to the controls for building height and siting that had been set out for the site and the adjoining site. Council have responded to the submission with an alternative approach to the overall massing and form of the site that has been developed into the current proposal. This revised heritage impact assessment responds to the revised proposal in the context that the form and massing have been negotiated with Council and in general terms are an appropriate way to proceed. As an overall observation, the current proposal is a significantly preferred approach to the ones that were required under the earlier controls demonstrating the complexity of developing meaningful and nuanced controls for significant uplift in development in areas such as the subject site.

There is no fundamental issue with developing the site as it has been identified as a site that is capable of major development. The assessment responds to the way in which the site is developed. This is fundamentality an urban design issue as good urban design encompasses the broad range of contextual issues that are fund on and around a site. As there is an adjacent heritage precinct and further away very significant National heritage sites, the urban design approach has to take this context as a key driver of how form is located and designed on the site. In this situation the heritage considerations largely relate to how the urban form and materiality establish a broad contextual setting in which the diminutive heritage elements nearby can have some meaning.

DKO have prepared a new set of documents that form the basis of this assessment.

The proposal is to develop a now vacant piece of land on the corner of Albert and O'Connell Streets in North Parramatta. The site contained the former North Parramatta Infants School that was abandoned some years ago and has since been demolished. Photos within the various reports show the school buildings extant as well as the site being now cleared as demolition took place recently. The former buildings had no heritage value and the site is not a heritage item nor within a heritage conservation area, it is however adjacent to the North Parramatta HCA to the east.

The updated planning controls for the site are set out in the urban design report and are not repeated in this report. In summary, the site is designated for large scale development for commercial and residential uses and, as a now vacant and quite large site, is capable of development. This heritage assessment considers the development of the site in relation to the heritage sites and precincts around it.

There are no heritage elements on the site itself, consequently the heritage considerations are contextual ones.

Context

The Tanner Kibble Denton heritage study of the broader precinct (as part of the planning for the State and National listed sites along the river front) included this land. The 2014 study established that the site had minimal heritage value and that only the two former medical examiners residences at the south of the block,

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outside the subject site fronting Fennell Street, had moderate heritage significance. These buildings are not heritage listed.

The area is however interesting as on the western boundary of the subject site there is a significant level change with an escarpment edge with the adjoining site to the west at a much lower RL. This was the quarry site used for the construction of buildings on the sites to the west and retains stone elements evidently built by one of the residents of the Asylum. This site is also not heritage listed and the rock face and other elements do not form part of the subject site. The adjoining land to the west is occupied by an aged housing complex which is presently undergoing partial redevelopment. It does not form part of this application but is part of the context of the site.

To the south of the site, fronting Fennell Street and within the street block are two interwar health staff residences (noted above) with newer developments located between them. Within the block of Albert, O'Connell, Fleet and Fennell Streets, there are no listed heritage buildings or features. However, a set of brick stairs and stone edged walkway to the north on the alignment of Albert Street and stone walling and kerbing along Fleet Street have heritage interest. On the western side of Fleet Street is the nationally significant Asylum and Orphanage site with its landscaped grounds and fine colonial buildings.

The subject site does not extend to either Fleet or Fennell Streets.

The following illustration from the TKD 2014 study summarises the heritage significance of the areas to the south and west in relation to its built form. This is the most recent and comprehensive assessment of significance of the site and relates it to the sites to the west that are largely of heritage significance. The plan gives a graphic indication of the relative significance of the built elements.

Within the block in which the site is located the two medical buildings to the south are toed as moderate significance and the stone walls and stairs as high significance, all other built elements have no significance.

The drawing also shows that the buildings to north and south of the block, that are contained within the study area, have no heritage significance.

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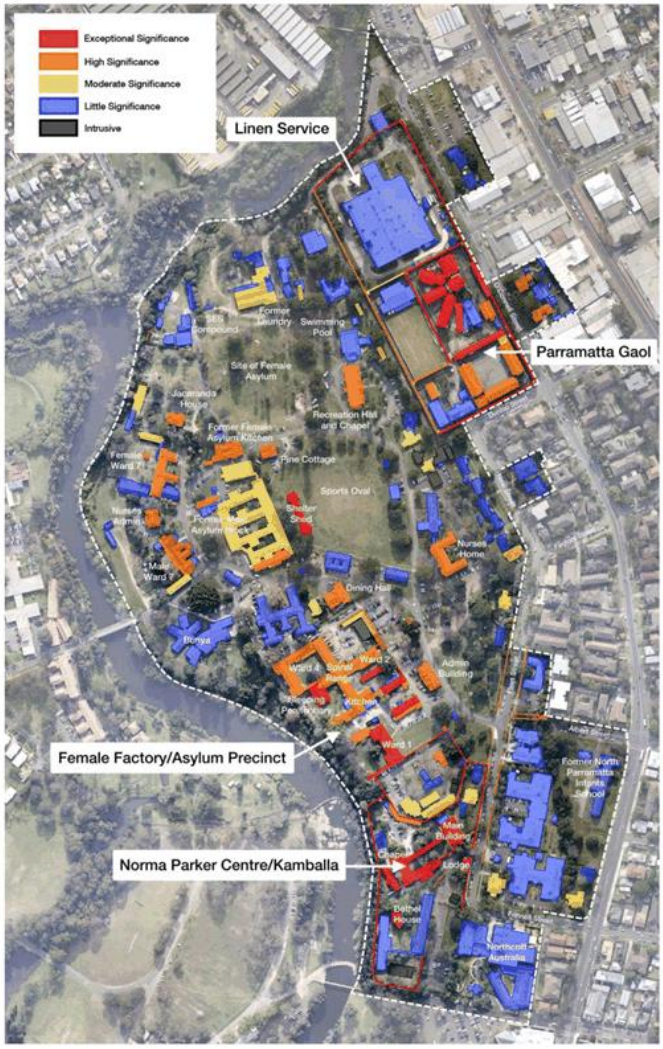

78 Summary Built Heritage Signfiicance Diagram for the Cumberland Precinct.
Source: Nearmap with TKDA overlay 2014.

Tanner Kibble Denton Architects October 2014 • Issue D 29

Figure i: The site is the former North Parramatta Infants School (lower right of drawing)l which, along with the buildings immediately to the west, are all indicated as having little significance. The former school has since been demolished.

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The Site

The subject site is currently vacant, a late twentieth century school complex having been demolished recently. Prior to the school development the site had been vacant and had no development take place on it. The 1943 aerial photo (figure iii) is informative as it shows the site as a vacant area without any apparent use, several small perimeter trees and pedestrian tracks across it leading from the south to the stairs at the end of Albert Street. There is also a track from the end of Harold Street to a set of stairs on the land to the west (down the escarpment). The lower land, a former quarry site, shows a tiered edge and what appears to be a formally laid out grassed area. The stairs no longer remain.

There is no specific heritage significance to the site. Both Albert and Harold Street are shown on early city plans as extending west to Fleet Street across and adjacent to the site. While Albert Street now connects as a pedestrian link, Harold Street was not taken up within the site and the road reserve was incorporated into the adjoining lots. An 1883 map (figures ii and viii) shows the site located on city blocks 84 and 85 and show the cross streets over the site.

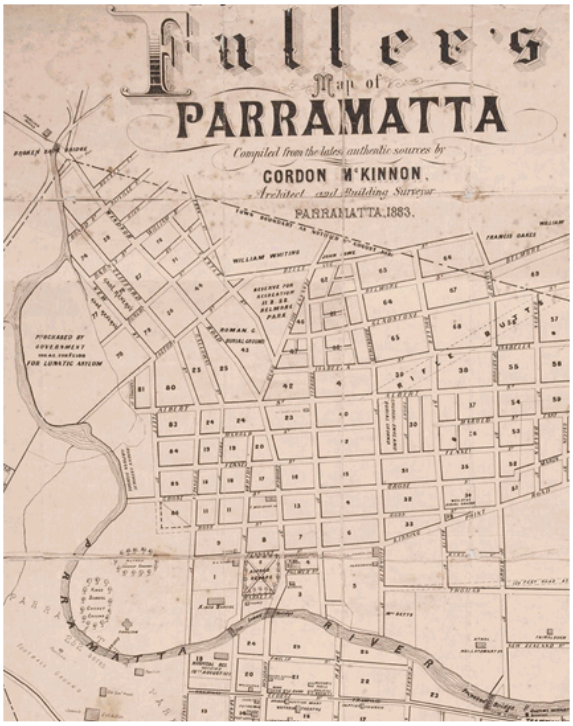

Figure ii: 1883 Fullers Map of Parramatta showing the site on blocks 83 and 84. The map shows a clear change from the city grid ending in Fleet Street and the riverfront lands of the Asylum and Orphanage and Parramatta Park. The change is a largely topographical one where city/residential development takes place on higher ground with the early sites located along the riverfront. The subject site, while not developed as part of the surrounding residential form is located on the higher land that was broadly taken up as part of the city. Refer to figure viii for a detail of the blocks.

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Figure iii: The 1943 aerial photo from Sixmaps showing the site and adjoining areas. This photo is the basis for the following sketches. The site is the irregularly shaped lot with a cleared area in the centre.

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Adjoining Development outside the 2014 study area

Two streets adjoin the site, Albert and O'Connell Streets.

Albert Street, where it adjoins the site to the north, is a dead-end street serving the site and a number of 3 storey apartment blocks dating to the 1960 and 1970 period that are located to the north. At the end of the street is a turning area and the brick and stone stairs stepping down to the level of Fleet Street. While the steps and rock faces around it are not heritage items and are not on the site, they have heritage significance in relation to the general pedestrian movement between the Asylum site and North Parramatta, this is, as noted, set out in the heritage study for the adjacent area.

O'Connell Street is a major traffic thoroughfare with no parking allowing the four lanes to operate as traffic lanes without parking. On the eastern side of the street is the North Parramatta heritage conservation area (HCA) that extends further east and south of the subject site but which terminates at Albert Street to the north. The HCA is mixed in character and integrity (refer to later analysis) and the focus of the current analysis is the interface and visual catchment around the subject site rather than the broader extent of the HCA.

The HCA is discussed in detail in the following section of this report.

North Parramatta Heritage Conservation Area

The North Parramatta HCA historically, particularly in the area adjacent to the site, comprised small cottages and larger houses from the mid Victorian through to the early twentieth century periods set on generally large lots. Some dwellings occupied several lots and there were also a number of vacant lots. This is clearly discernible on the 1943 aerial and the overlay sketches in this report (figures iii-vi)

The area was characterised by dwellings, largely built close to the front street alignment, sometimes with small side setbacks but also with considerable open space between buildings. Street corners were generally tightly built to, and the corner buildings have mostly survived where many of the intermediate cottages have been demolished and the sites redeveloped.

Most redevelopment of the HCA (and the adjoining areas near the site) took place from the 1960s, as evidenced by how little new development can be seen in the 1943 aerial photo where the precinct remains largely as it was around 1900.

The predominant form of redevelopment has been three storey apartment blocks, some occupying an original lot but most being built on amalgamated lots. There are two apartment buildings fronting O'Connell Street opposite the site and all the sites north of Albert Street fronting the site, while not in the HCA, contains apartment buildings. Where sites are amalgamated for development or have apartment buildings there is a significant change in the character of the area.

The following drawings show the area around the site, including the HCA and the changes that have taken place since the 1943 aerial photograph. The TKD 2014 report does not include these areas in its historical analysis and drawings as the site was vacant apart from quarrying until the Interwar period.

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Figure iv: An overlay of the 1943 aerial photograph showing the subject site in yellow, Heritage Items in orange and sites that have been changed (either by demolition and redevelopment or development on vacant land) in blue. Sites uncoloured are pre 1943 sites that are not heritage listed. The HCA is indicated with a dashed line. Paul Davies 2022.

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Figure v: An overlay of the 1943 aerial photograph showing heritage items in yellow with the buildings shown in orange, contributory buildings in green and demolished buildings in purple. The purple shading on sites are former vacant sites that have been developed since 1943. Paul Davies 2022.

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Figure vi: An overlay drawing showing the subject site in yellow in relation to the HCA. Redeveloped sites are shown in blue and heritage streetfront interfaces are shown in orange. Paul Davies 2022.

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Figure vii: An overlay drawing showing the visual catchment from the site with a 150 metre circle. Apart from some distant views to the west, 150 metres captures everything that can be seen in relation to the site. Heritage buildings are cross-hatched. Four view locations are identified. Paul Davies 2022.

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The heritage character of the HCA, as it relates to O'Connell, Albert and Harold Streets and their interface with the subject site is quite mixed. Within the HCA of the 13 lots that existed fronting O'Connell Street in 1943, 3 have been amalgamated to form an apartment site and one dwelling was demolished also for an apartment building. There are 5 heritage items and 3 contributory buildings remaining along O'Connell Street. The corner of Harold Street has lots oriented to O'Connell Street where the corner of Fennell Street has lots fronting Fennell Street. The corner of Albert Street has lost the early buildings on the northern corners with the remaining group of 3 early cottages aligned to O'Connell Street. There is no clear hierarchy of streets historically although O'Connell Street clearly has had a more major role in vehicle movements over time.

There has always been a disparity across O'Connell Street with the eastern edge of the street forming the boundary between residential development and initially open space and then the school use. The land between O'Connell, Fleet, Albert and Fennell Streets has had a different and distinctive character and over time has accommodated a range of more institutional built forms than the surrounding residential areas. There has always been a change of form and character in the block that has set it apart from the adjoining residential areas. The Orphanage site to the west, an important heritage site, has a different character again to any of the blocks to the east. It contains very significant built elements within a broad landscape. There is an interface with that site across Fleet Street, particularly to the land below the escarpment directly opposite but no links to the subject site or areas beyond.

Council zoning and planning for the subject site and the whole block has been predicated on more intense development taking place. The issue of the broad approach to development on the site is determined and now forms part of the planning controls for the site. The recent input from Council that has changed the urban form of the earlier proposal (that responded to the controls that were in place) is a further refinement of the broader decision to see separation between the HCA to the east and the subject site to the west.

The matters that a heritage assessment need to consider are not the use or overall scale of development that may take place but how a particular design response to the planning controls responds to the heritage values of the adjacent HCA and, slightly more distant, to the Orphanage site.

Consideration of relationship of the site to the adjacent heritage areas

The interface between the subject site and the HCA is important and, in some respects, challenging. The heritage significant sites in the HCA (both heritage items and contributory places) are single storey small cottages set close to the street. Other later developments, that are not significant and which detract from the character of the HCA, are mostly 3 storey apartment buildings that are set back from the street frontages. The controls for the subject site, provide for significantly higher and denser forms directly opposite the HCA and consider a large vacant site. This is in contrast to the potential of small infill development on the adjoining sites within the HCA.

The assessment of heritage impact is not whether development should take place on the subject site but how it should be designed to respond to some of the characteristics of the HCA and to establish a relationship across O'Connell Street that allows the scale and character of the HCA not to be diminished. The urban design report sets this out as a response to the heritage character of the adjacent HCA.

New development cannot replicate the form or scale of development in the HCA, that would not be appropriate.

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Figure viii Elevated site view showing the revised proposal in relation to the surrounding areas and in particular the HCA immediately to the east of the site, it also shows the proposed maximum building envelopes for the site to the west.

Some of the characteristics that can inform new design are:

- The traditional pattern of lots in the HCA fronting O'Connell Street that can be reflected in articulation of the new built form
- Setbacks of buildings
- Extending the street forms and vistas such as Harold Street onto the site, responding both to the original block layout and allowing longer views through the site
- Creating new through site links that can respond to the tracks seen in the 1943 aerial photographs and which enhance the use of the stairs at the end of Albert Street
- Articulating the height of development along O'Connell Street to create variety in form as well as the use of setbacks and indents to modulate the built form
- The design of new development to use a range of materials including traditional materials that give human scale to the frontage
- Landscaping on the site can use planting forms from the nearby heritage sites to create continuity rather than the generic landscaping found around commercial and residential developments
- Creating a balanced relationship of new and larger and existing and smaller by the use of setbacks

The recent council review of the site controls and how they affect future development potential has resulted in the revised approach to the urban planning and massing of the site. This is a positive move that responds to the statements in the former Heritage Assessment that were critical of the height and massing controls.

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O'Connell Street is a major thoroughfare and not a suburban street, the setting will always be uncomfortable for the diminutive heritage buildings on the eastern edge, but this is largely due to the traffic intensity and loss of the residential street character that arises from having a major road as the frontage to the HCA.

Figure ix Elevated view showing materiality. From DKO Design report.

The revised design approach creates a strong street wall along O'Connell Street with refined modulation and articulation and a relatively consistent street wall height. The generous building setback allows a wide 'avenue' with linear tree plantings on the western side of O'Connell that provides a substantial increase in the actual and perceived street width.

The introduction of the landscape edge to the street changes the character of the street dramatically and gives the smaller buildings to the east a more spacious frontage. The materiality of the new street front elements further assists in creating a more appropriate overall setting.

A key and usually contentious matter in considering new forms of denser development is the question of height. The site has had controls that anticipate much greater density, bulk and height. The controls set an intent to manage the overall scale of development. The key elements of that intent, as articulated in the revised design approach, are to create significantly more space between new built form and O'Connell Street and, as a result, the HCA opposite and to establish a street wall height that even though higher and denser

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than the HCA has a balanced relationship to it by virtue of setbacks, materiality, articulation, etc. This is successfully managed in the proposal.

The proposal also contains two taller elements that allows much greater ability to resolve the open space, setbacks and lower forms on the site while achieving a reasonable development response. It is noted that the height of these elements has no impact on the HCA opposite and whether they are slightly smaller or larger does not change the important relationships between the two sides of O'Connell Street as they are experienced from ground level. While the imagery shows aerial views, the experience of the proposed development for a pedestrian or someone in a car is completely focussed on the ground plane and how it is defined through the tree lined walkway, the setbacks that provide from the development filtered views across the road to the HCA and from the HCA a well-designed street wall set well back behind the avenue of tree plantings. The taller elements will of course be seen, but they do not form an important part of the experience at ground level.

A further observation is that when an HCA is mapped, the intent is to capture coherent heritage values, ideally with whole streetscapes but, where that cannot happen, by defining a clear edge. The internal streets of the HCA achieve this first objective as they allow an experience of small scale heritage elements along both sides of streets. In some instances an HCA boundary may be the rear alignment of properties in a street to capture both sides of the street. Where an edge such as O'Connell Street exists that marks the termination of the values that are sought to be protected within the HCA, a different relationship exists. In this instance that edge is degraded by the quality of the main road. Carefully managed development to the west, as is proposed is a sound urban outcome to resolve some of those edge issues.

HCA's are also intended to be experienced large from within, that is they are not created with the intent of looking out of them at surrounding development no matter what that development is. The proposal provides an excellent potential to see the HCA across O'Connell Street from a designed urban setting that is not currently available. Conversely, if a pedestrian is on the eastern side of O'Connell Street they will continue to experience the HCA as it is now and if they look west away from the HCA will see the extended setting that has been created. These are very positive benefits from the design approach that are not affected by the actual heights of the lower street front buildings or the larger elements behind.

The revised proposal has some areas of greater height. The setting of the larger form along Albert Street is logical, was originally proposed but did not comply with the council site controls. The higher form is setback from O'Connell Street so that the corner of O'Connell and Albert Streets can be read as the lower form and the orientation of the building with a large north face is a good environmental outcome.

A second larger form is set towards the middle of the site along O'Connell Street but is also set back from the main street front forms.

The site is separated into four distinct built forms along O'Connell Street with the major building separation adopting the east-west alignment of Harold Street. This was also a design element that was considered in the earlier scheme but which did not eventuate, again due to the way the council controls on the site operated. The alignment of open space allows longer views through the site to the west from Harold Street and it is noted that the conceptual planning for the site to the west also adopts this spatial arrangement to ensure that those long views are maintained when and if that site is developed.

Asylum and Orphanage Sites

Any development beyond several storeys on the site will be seen from the Orphanage site as development is set above the escarpment face and elevated above the current development on the Fleet Street lots. The planning controls provide for much higher and denser development along Fleet Street that would, in time,

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potentially screen, or at least in part screen, views to development on the subject site. There appears to be a clear intent in the LEP controls for the whole block to be developed intensely over time.

Any impacts on the Orphanage site are about what is potentially seen from that site of new development to the east. There are no impacts of development on views to the Orphanage as it cannot be seen from O'Connell Street or Albert Street due to the depth of the site, the level changes to the west and the vegetated edge along the escarpment line. It is noted that the rock face is located wholly on the lots to the west and does not form part of the subject site.

Prior to 1943 and until the western lots of the block were developed for aged care use and the subject site was developed as a school site, the land was open apart from the two health buildings fronting Fennell Street (Interwar buildings). Over time the lots have been developed and created a built interface to the Orphanage. The proposed development while larger than what has occupied the site previously responds to the planning controls and the changes of scale, form and design along the western frontage of the site. This assists in breaking up the form and scale as viewed from the west.

As noted above any development of more than a few storeys will be seen from the Orphanage grounds and parts of some buildings, particularly if the western part of the block is not developed as allowed for in the planning controls. This will be a change in the broader setting that has clearly been anticipated in developing the planning controls.

In some respects, locating higher development above the quarry face rather than below it allows the setting of the Orphanage to be expanded. That is the current low scale development on the eastern edge of Fleet Street creates an immediate visual setting that defines the edge of the Orphanage site as the quarry edge. While the sites east of Fleet Street are not part of the Orphanage site, the immediate visual setting benefits from lower development along Fleet Street. Setting articulated and higher built forms further east, with greater separation to the Orphanage site will be seen but will be in the backdrop of the site and will not significantly change the context.

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Figure x: Detail of Fullers 1883 Map showing Blocks 83 and 84 that contain the proposed site. Note Harold Street was originally intended to disect the site but was not created.

Proposal

The proposal is set out in the DKO drawings and report with clear background analysis on the changes from the initial proposal. The proposal is well illustrated in figure ix that shows the setbacks, form, distribution of height across the site, the landscaped boulevard, vistas, etc. This report does not consider other aspects of the proposal but it is noted that creating roof gardens with small setback elements will further soften the overall forms as greenery develops at higher levels.

Set out following is a summary of the outcomes of the current proposal in relation to the heritage context of the site:

- The revised site setbacks allows the streetscape of O'Connell Street to be extended to the west to establish a more fitting relationship to the HCA opposite.
- The creation of, in effect, a landscaped boulevard along the site frontage changes the spatial arrangement of the street and assists in mitigating the impact of the heavy traffic usage that has had an adverse impact on the setting of the HCA. Separation of the proposed development from the road assists in creating a precinct approach across O'Connell Street in contrast to the road being a visual barrier between areas.
- The setbacks provide an outlook from the HCA to landscape with the larger buildings beyond, the rooftop landscape will further benefit this outlook.

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- The landscaped boulevard allows a filtered view from the development site from what will be active frontages to the HCA beyond.
- The creation of the void space aligned with Harold Street reinforces the street grid pattern and allows longer views through the subject site.
- The massing of the buildings along O'Connell Street is articulated into discrete forms with varying materiality with a six level street form. The lowering of the street height and the setbacks provide a more generous relationship to the street and HCA opposite.

Recommendations

It is always difficult to consider new larger scaled development within the context of small residential buildings or complexes such as the Orphanage site. However, it is possible to undertake development provided that the new work has a well-designed interface and form that creates good urban form and spaces as well as responding to some of the characteristics of the adjacent heritage places.

As observed, it is not possible to respond in height and scale to the small cottages by using similar forms. In relation to the HCA, the street separation allows a scale change by nature of the intensity of use of the road and then using the elements set out earlier of articulation, scale changes, materiality, pattern and rhythm of the street front buildings to establish an urban form that is varied and subtle while being of larger scale.

Using lower forms along O'Connell Street is essential to managing scale transitions. Designing the complex in response to the HCA and the significant sites to the west that are more distant is critical. While the term design excellence is widely used and not always understood, on this site the testing of design options through design excellence provides a contextual approach to design. The urban study focuses on the setting around the site as a starting point to develop forms, open space and massing. This is conceptually sound and can be further developed through a detailed design process to achieve a high-quality urban outcome for the site and area.

The initial reference scheme responded to the controls that were in place and to the context of the area. The revised scheme, with a much more nuanced set of site controls allows a significantly better contextual outcome particularly with regard to heritage matters. For a large up-scaling of development on the site, the reference scheme provides a well-balanced and responsive approach to heritage relationships and context.

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TRAFFIC AND TRANSPORT PLANNERS

TRAFFIC & TRANSPORT IMPACT ASSESSMENT

Planning Proposal
9 Albert Street & 31 O'Connell Street, North Parramatta

Reference: 21.564r05v02
Date: February 2024

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DOCUMENT VERIFICATION

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Client	Peterose Pty Ltd			
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TRAFFIX

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Appendices

Appendix A: Reduced Plans

Appendix B: Urban Design Report

TRAFFIX

1. INTRODUCTION

TRAFFIX has been commissioned by Peterose Pty Ltd to undertake a traffic and transport impact assessment (TTIA) in support of a Planning Proposal for a mixed-use development at 9 Albert Street and 31 O'Connell Street, North Parramatta. It is proposed to vary the floor space ratio and height controls for the site under the Parramatta Local Environmental Plan (LEP) 2011.

For the purposes of the planning proposal, an indicative development concept has been formulated by DKO Architecture comprising retail, childcare, and residential components. This report assesses the traffic impacts and parking requirements arising from this scheme, which is considered to be representative of the site being developed to its full potential when incorporating the proposed planning controls.

The site is located within the City of Parramatta Council Local Government Area (LGA) and the concept scheme has been assessed under that the relevant Council controls.

This report documents the findings of our investigations and should be read in the context of the Planning Proposal Justification Report prepared separately. The development will require referral to Transport for NSW (TfNSW) under Schedule 3 Chapter 2 of the State Environmental Planning Policy (Transport and Infrastructure) 2021.

The report is structured as follows:

- Section 2: Describes the site and its location
- Section 3: Documents existing traffic conditions
- Section 4: Describes the concept development
- Section 5: Assesses the parking requirements
- Section 6: Assesses traffic impacts
- Section 7: Discusses access and internal design aspects
- Section 8: Presents the overall study conclusions

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2. LOCATION AND SITE

The subject site is known as 9 Albert Street and 31 O'Connell Street, North Parramatta (Lot 1 of DP 1143431), and is located at the south-western corner of the intersection of Albert Street and O'Connell Street. It is also located approximately 1-kilometre north of the Parramatta Central Business District and approximately 340 metres northwest of the future Fennell Street Light Rail Stop.

The site has a total site area of 8,921m² and historically accommodated a community facility development. It is bound to the east by O'Connell Street and to the north by Albert Street for approximately 143 metres and 78 metres, respectively. It is bound to the west and south by an aged care facility and a crisis accommodation development.

Vehicular access to 9 Albert Street is currently provided via Albert Street along the northern boundary of the site, and vehicular access to 31 O'Connell Street is via O'Connell Street along the eastern boundary of the site.

A Location Plan is presented in **Figure 1**, with a Site Plan presented in **Figure 2** which provides an appreciation of the general character of roads and other key attributes in proximity to the site.

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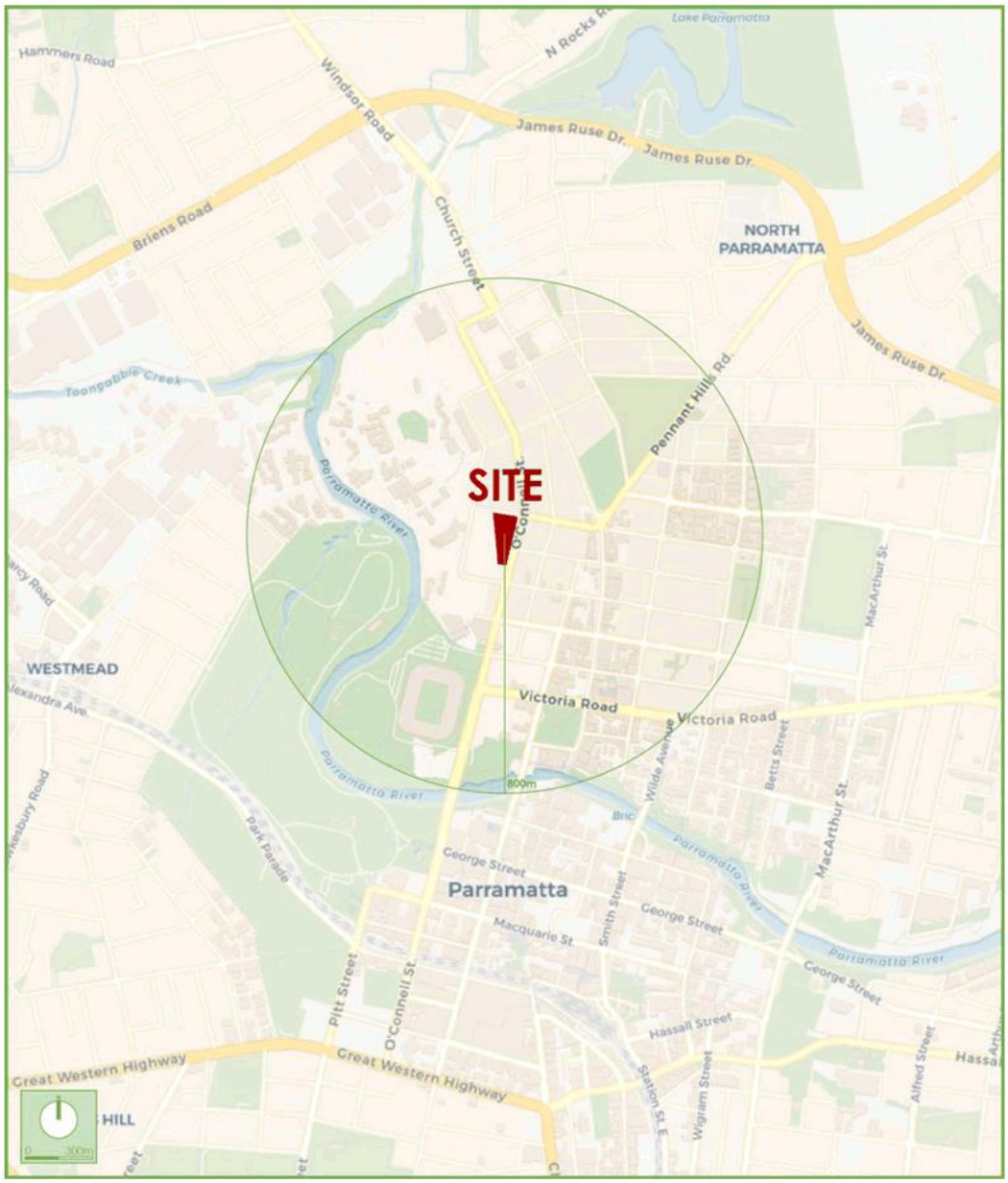

Figure 1: Location Plan

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Figure 2: Site Plan

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3. EXISTING TRAFFIC CONDITIONS

3.1 Road Network

The road hierarchy in the vicinity of the site is shown in **Figure 3** with the following roads of particular interest:

- Church Street: part of a TfNSW Main Road (MR 184), Church Street generally traverses north to south between North Rocks Road in the north and Darcy Street in the south. Within the vicinity of the site, Church Street accommodates a single traffic lane in either direction. The Parramatta Light Rail runs along Church Street between Factory Street in the north and Macquarie Street in the south. Kerbside parking is not permitted along either side of the road.
- O'Connell Street: part of a TfNSW Secondary Road (2066), O'Connell Street generally traverses north to south between Board Street in the north and the Great Western Highway in the south. Within the vicinity of the site, O'Connell Street is subject to a 60km/h speed limit and carries two (2) lanes of traffic in each direction within a divided carriageway. Kerbside parking is not permitted along either side of the road.
- Pennant Hills Road: part of an Unclassified Regional Road (7273) (between James Ruse Drive and Church Street), Pennant Hills Road generally traverses east to west between the Pacific Highway in the east and Church Street in the west. Within the vicinity of the site, Pennant Hills Road is subject to a 60km/h speed limit and carries two (2) lanes of traffic in each direction within an undivided carriageway. The kerbside lanes are subject to "Clearway" restrictions between 6:00am - 10:00am and 3:00pm – 7:00pm Monday to Friday and kerbside parking is permitted along sections of this road outside of these restrictions.

- Albert Street: part of an Unclassified Regional Road (7273) (between Church Street and O'Connell Street) and a local road west of O'Connell Street, Albert Street generally traverses east to west between Buller Street in the east and terminates 130m west of O'Connell Street in the west. It generally accommodates a single lane of traffic in either direction and is subject to a 50km/ speed limit. "School Zone" restrictions are applicable east of O'Connell Street between 8:00-9:30am and 2:30-4:00pm on school days. Kerbside parking is permitted along either side of the road west of O'Connell Street, subject to timed restrictions.
- Harold Street: a local road that generally traverses east to west between Brickfield Street in the east and O'Connell Street in the west. Harold Street carries a single lane of traffic in either direction and is subject to a 50km/h speed limit. Kerbside parking is permitted along either side of the road, subject to timed restrictions.

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Figure 3: Road Hierarchy

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3.2 Key Intersections

The key intersections in the vicinity of the site are shown below and provide an understanding of the existing road geometry and alignment in the locality.

3.2.1 Intersection of Albert Street, Church Street and Pennant Hills Road

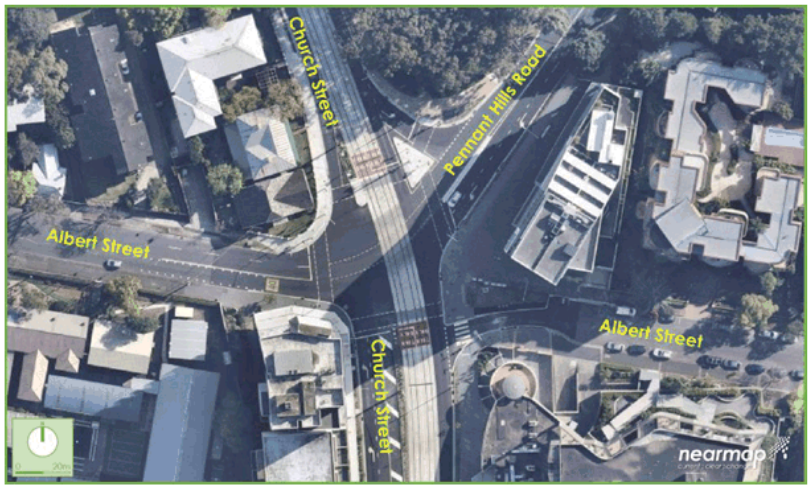

Figure 4: Intersection of Albert Street, Church Street and Pennant Hills Road

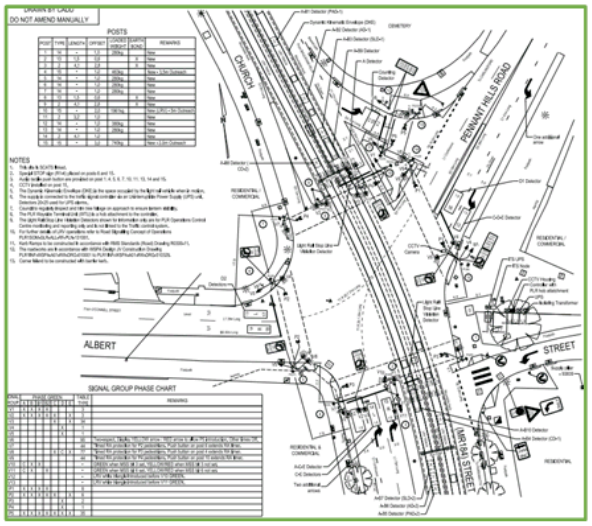

Figure 5: Intersection of Albert Street, Church Street and Pennant Hills Road (Ultimate Layout)

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It can be seen from **Figures 4** and **5** that the intersection of Albert Street, Church Street and Pennant Hills Road is a four-legged signalised intersection. All legs of the intersection provide signalised pedestrian crossings. The main attributes of each approach in the ultimate layout are outlined below.

- Church Street (north and south legs)
  - The southbound approach provides a single through lane from which vehicles can use a slip lane to turn left onto Pennant Hills Road. Right turn movements are banned for this approach.
  - The northbound approach provides a shared through/left turn lane and two (2) dedicated short right turn lanes.
  - Church Street accommodates the route for the Parramatta Light Rail. A northbound light rail line and a southbound light rail line are accommodated in the centre of the roadway.
- Pennant Hills Road (east leg):
  - The westbound approach provides a dedicated left turn lane and a through lane. Right turn movements are banned for this approach
- Albert Street (west leg):
  - The eastbound approach provides two (2) through lanes. Right turn movements are banned for this approach. Left turns are permitted from the kerbside lane.

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3.2.2 Intersection of Albert Street and O'Connell Street

Figure 6: Intersection of Albert Street and O'Connell Street

It can be seen from Figure 6 that the intersection of Albert Street and O'Connell Street is a four-legged signalised intersection. All legs of the intersection provide signalised pedestrian crossings. The main attributes of each approach are outlined below.

- O'Connell Street (north and south legs)
  - The southbound approach provides two (2) through lanes. Right turn movements are banned for this approach.
  - The northbound approach provides a dedicated right turn lane and two (2) through lanes.
- Albert Street (east and west legs):
  - The eastbound approach provides a single through lane from which left and right turns are permitted.
  - The westbound approach provides a dedicated left turn lane and a single through/right turn lane.

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3.3 Public Transport

The existing public transport services that operate in the locality are presented in Figure 7 and are summarised as follows:

3.3.1 Bus Services

The subject site is within optimal walking distance (400 metres) of several bus services. These services and destinations are summarised in Table 1 below:

Table 1 – Bus Routes and Services

No.	Route	No.	Route
546	Parramatta to Epping	606	Winston Hills to Parramatta
552	Oatlands to Parramatta	706	Parramatta to Blacktown
549	Parramatta to Epping	550	Parramatta to Macquarie Park
600	Hornsby to Parramatta	625	Pennant Hills to Parramatta
601	Rouse Hill Station to Parramatta	609	Parramatta to North Parramatta
603	Rouse Hill Station to Parramatta	900	Parramatta Free Shuttle
604	Dural to Parramatta		

3.3.2 Future Light Rail Services

In addition, three (3) stops along the future Parramatta Light Rail are located within 400 metres of the subject site. These stops are outlined below:

- Ngara Light Rail Stop;
- Benaud Oval Stop; and
- Fennell Street Stop.

Stage 1 of the Parramatta Light Rail is currently under construction and is anticipated to be opened in 2024, well before the subject site is fully developed. This will provide a future connection between Westmead and Carlingford via the Parramatta CBD.

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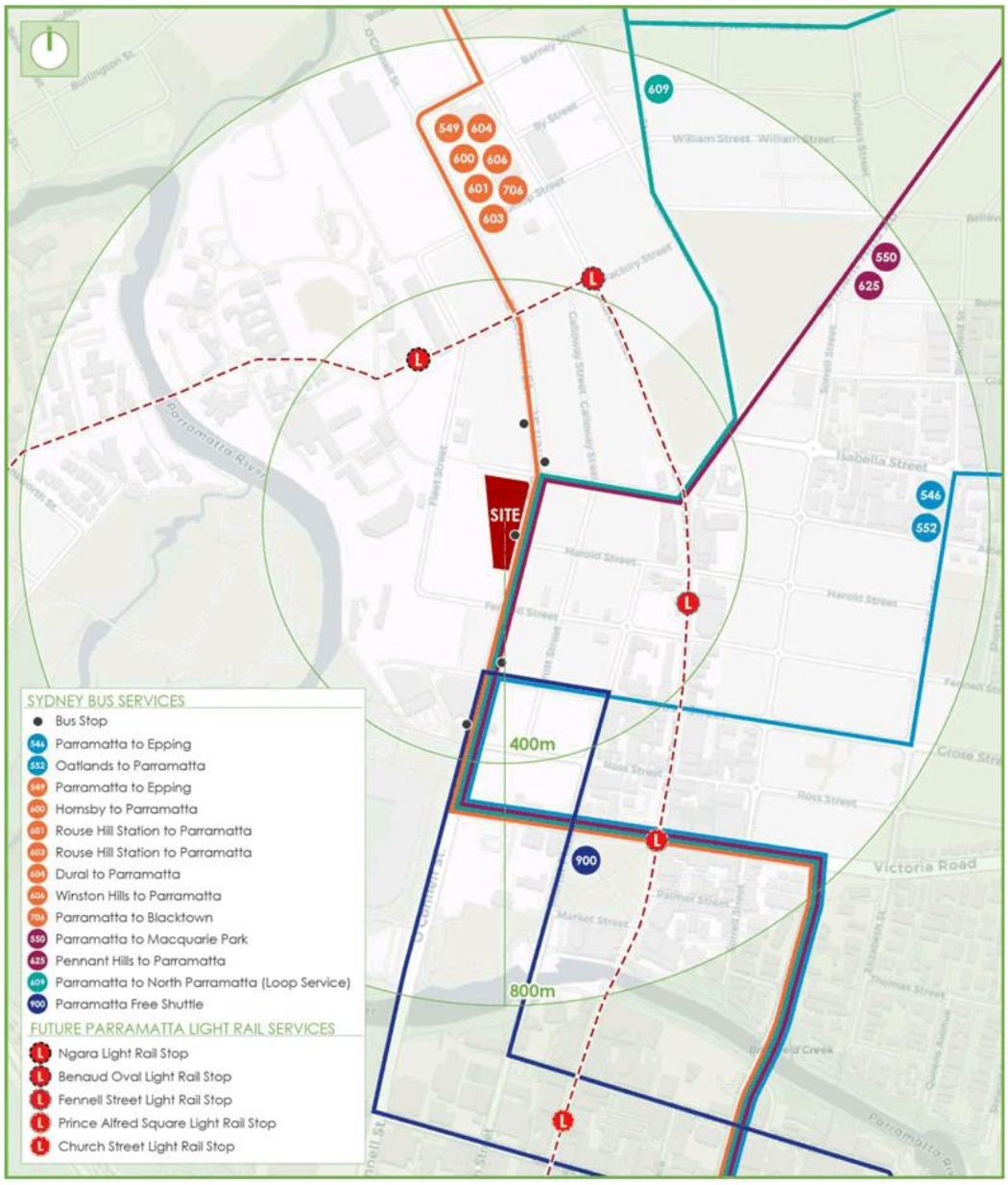

Figure 7: Public Transport

3.4 Walking and Cycling

3.4.1 Walking Facilities

The site is ideally placed with several pedestrian facilities available in the locality. There are existing pedestrian footpaths surrounding the site, with footpaths provided along both sides of O'Connell Street and the northern side of Albert Street adjacent to the site. The signalised intersection of Albert Street and O'Connell Street provides signalised pedestrian crossings on all four (4) legs.

3.4.2 Cycling Infrastructure

The site is also located within proximity to separated bicycle lanes, off-road shared paths and bicycle friendly roads available throughout the area. These cycleways can be used concurrently with other bicycle routes to provide connections to various areas around Parramatta. The existing cycling facilities are presented in **Figure 8**, with the cycleways summarised as follows:

- On-Road Cycle Routes: O'Connell Street north of Albert Street, Grose Street and Albert Street east of O'Connell Street accommodate on-street cycling routes. These routes provide access towards the town centres within North Parramatta and Northmead.
- Off-Road Cycle Routes: O'Connell Street south of Albert Street and the Parramatta River foreshore accommodates off-road cycling routes. These routes provide access to the Parramatta CBD and Westmead.
- Regional Cycle Routes: O'Connell Street in the vicinity of the site and the Parramatta River foreshore accommodate regional cycle routes. O'Connell Street south of Albert Street and the Parramatta River cycle route are classified as off-road cycle routes and are shared paths.

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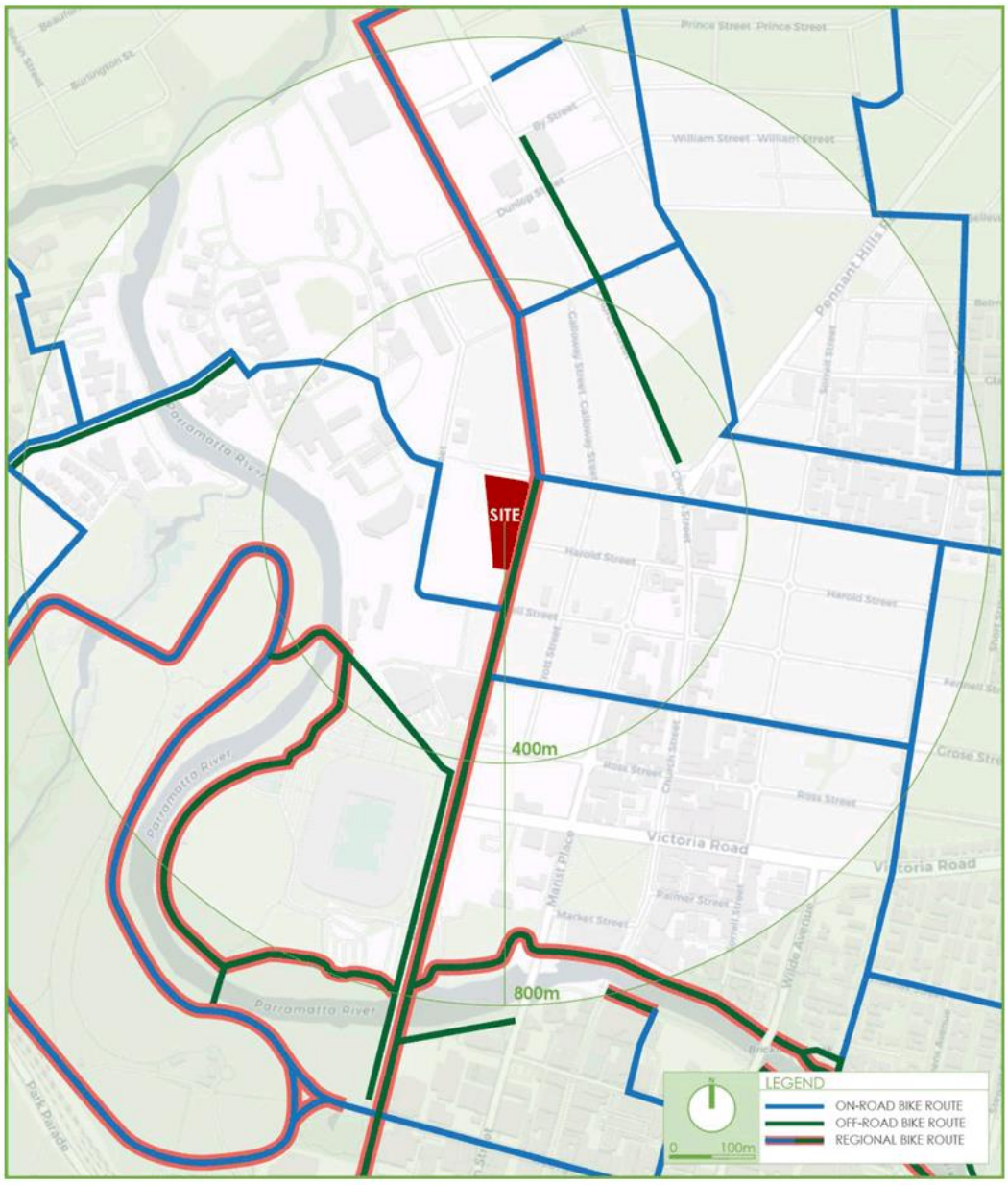

Figure 8: Existing Cycle Infrastructure

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3.4.3 Car Share Services

The site is also within 400 metres of two (2) GoGet car pods located in the North Parramatta area. This scheme allows share cars to be rented for short-term trips. The existing GoGet car pods in the locality are presented in **Figure 9** below. Other car share providers are also available within walking distance of the site.

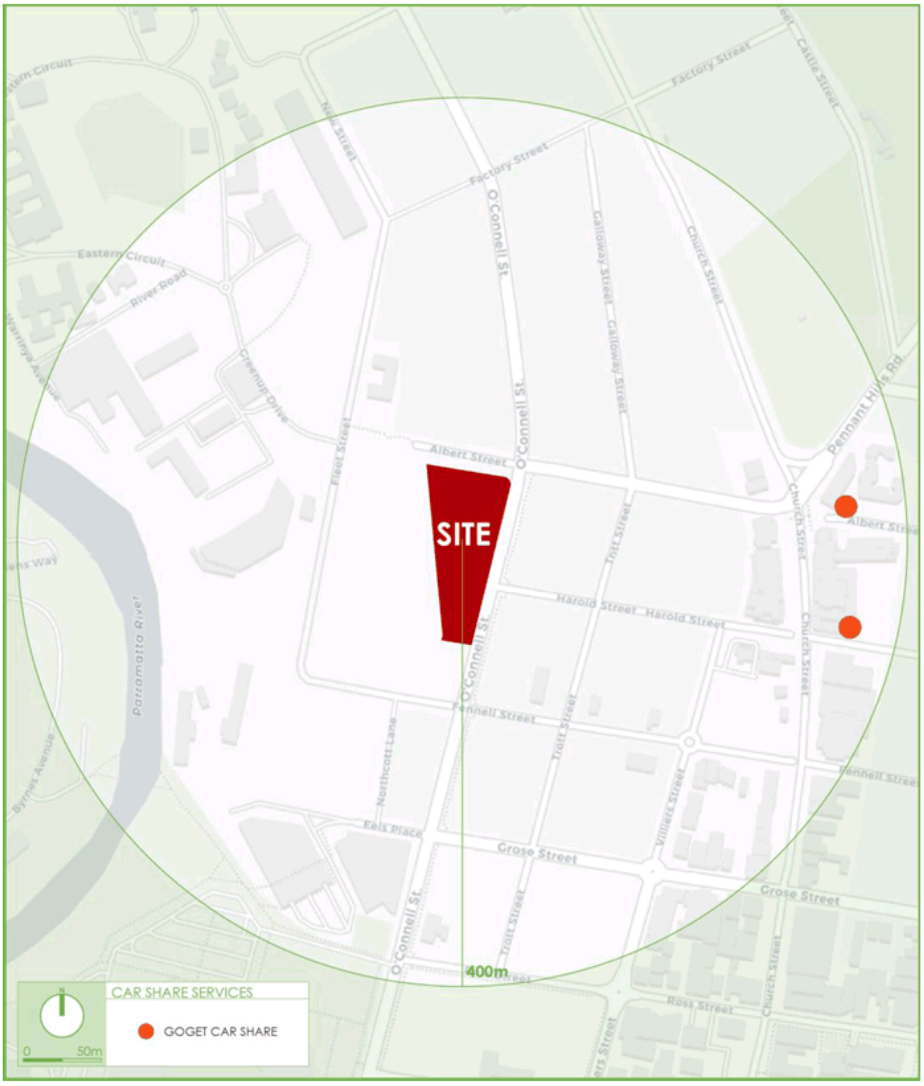

Figure 9: GoGet Pods

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3.5 Existing Travel Behaviours

To analyse the existing travel mode behaviours of the locality, 2016 ABS Census data was obtained for the 'North Parramatta' Statistical Area (SA2). This is summarised in **Table 2** below for residents and in **Table 3** for staff that work within North Parramatta.

Table 2 – Resident Travel Mode Behaviours

Travel Mode	Percentage (%)
Train	23.3%
Bus	7.5%
Ferry	0%
Tram	0%
Taxi	0.4%
Car, as driver	50.1%
Car, as passenger	4.0%
Truck	0.5%
Motorbike/ Scooter	0.5%
Bicycle	0.9%
Walked Only	9.4%
Other mode	0.5%
Worked At Home	2.9%

The Journey to Work data shows that 50.1% of residents from the North Parramatta Statistical Area (SA2) travel to work by car as a driver, 23.3% of residents travel to work by train and 7.5% of residents travel to work by bus. There is a moderate uptake in active transport consisting of 10.3% of residents, this includes 0.9% cyclists and 9.4% walking. It is expected that once the Parramatta Light Rail is operational, there will be move away from private vehicle trips to/from the site.

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Table 3 – Staff Travel Mode Behaviours

Travel Mode	Percentage (%)
Train	8.9%
Bus	4.0%
Ferry	0%
Tram	0%
Taxi	0.2%
Car, as driver	73.2%
Car, as passenger	4.7%
Truck	0.4%
Motorbike/ Scooter	0.3%
Bicycle	0.3%
Walked Only	4.0%
Other mode	0.4%
Worked At Home	3.5%

The Journey to Work data shows that 73.2% of staff working in the North Parramatta Statistical Area (SA2) travel to work by car as a driver, 8.9% of staff travel to work by train and 4% of staff travel to work by bus. In addition, 4.3% of staff travel to work by active transport, this consists of 0.3% cyclists and 4.0% walking only. It is expected that once the Parramatta Light Rail is operational, there will be move away from private vehicle trips to/from the site.

TRAFFIX

4. DESCRIPTION OF CONCEPT DEVELOPMENT

A detailed description of the concept development adopted for the purpose of assessing the planning Proposal impacts is provided in the Planning Proposal Justification Report prepared separately. In summary, the concept development is a mixed-use development comprising of the following components:

- Construction of a mixed-use development comprising:
  - 780m² of retail GFA;
  - A childcare centre accommodating for 120 children; and
  - 370 residential apartments made up of the following:
    - 92 x one-bedroom apartments;
    - 227 x two-bedroom apartments;
    - 50 x three-bedroom apartments; and
    - 1 x four-bedroom apartment.
- Two (2) basement levels accommodating approximately 440 parking spaces.

The parking and traffic impacts arising from the concept development are discussed in **Section 5** and **Section 6**. Reference should be made to the Urban Design Report submitted separately to the Council/Department of Planning and Environment which is presented in **Appendix A**.

It is emphasised that further analysis will be provided at development application stage, based on a confirmed development yield.

TRAFFIX

5. PARKING REQUIREMENTS

5.1 Car Parking

The subject site falls within the boundaries of the City of Parramatta LGA and is located within 800m of the future Fennell Street Light Rail Stop. The State Environmental Planning Policy No 65 (SEPP 65) states that an application or the carrying out of development to which this policy applies satisfies the following design criteria, the consent authority must not refuse the application because of those matters:

> *(a) If the car parking for the building will be equal to, or greater than, the recommended minimum amount of car parking specified in Part 3J of the Apartment Design Guide.*

Objective 3J-1 of the Apartment Design Guide specifies that for developments on sites that are within 800 metres of a light rail stop in the Sydney Metropolitan area, the minimum car parking requirement for residents and visitors is set out in the TfNSW Guide to Traffic Generating Developments (TfNSW Guide), or the car parking requirement prescribed by the relevant council, whichever is less. It is noted that lesser rate of the two is the TfNSW Guide rates for residential flat buildings. As such, the TfNSW Guide rates have been adopted for the residential components of the site. This is consistent with Council's advice regarding parking.

In relation to the other land uses of the concept development, the Parramatta Development Control Plan 2023 is applicable for the site.

The minimum required parking provisions in accordance with the above are summarised in **Table 4** below.

TRAFFIX

Table 4 – Parking Rates and Provision

Type	Area / Units	Minimum Parking Rates	Minimum Spaces Required	Spaces Provided
Retail				
Retail	780m²	1 space per 30m² GFA	26*	0
		Sub-Total	**26***	**0**
Childcare				
Childcare centres	120 children	1 space for every 4 children in attendance	30	30
		Sub-Total	**30**	**30**
Residential				
One Bedroom	92	0.6 spaces per dwelling	331	336
Two Bedrooms	227	0.9 spaces per dwelling		
Three/Four Bedrooms	51	1.4 spaces per dwelling		
Residential Visitor	370	1 space per 5 dwellings	74	74
		Sub-Total	**405**	**410**
		Total	**435**	**440**

* 40% of residential visitor parking (30 spaces) to be shared with retail as per Council advice.

It is evident from Table 4 that the concept development is required to provide a minimum of 435 parking spaces under the SEPP and DCP requirements, noting that 30 residential visitor spaces are to be shared with the retail component.

The concept development currently proposes 440 car parking spaces over two (2) levels of basement car parking. It is concluded that the site is sufficiently large enough to accommodate the required parking provision for any future development permissible under the Planning Proposal.

5.2 Accessible Parking

Council's DCP specifies that for a residential development with more than 20 dwellings, 10% of the dwellings are required to be adaptable. The Building Code of Australia requires that each adaptable dwelling is provided with an adaptable parking space. This results in a requirement for 37 residential accessible parking spaces. The BCA does not specify a minimum rate for accessible parking for residential visitor parking.

For the retail use within the site, the BCA requirements stipulate 1 accessible parking space for every 50 car parking spaces or part thereof. The retail accessible parking provision will be further developed at a future DA stage.

In relation to the childcare use on site, the BCA requirements stipulate 1 space for every 50 carparking spaces or part thereof. The childcare accessible parking provision will be further developed at a future DA stage.

It is concluded that the site is sufficiently large enough to accommodate the required accessible parking provision for any future development permissible under the Planning Proposal.

5.3 Refuse Collection and Servicing

Council's DCP does not provide loading bay requirements for retail, childcare, or residential developments, and references the TfNSW Guide to Traffic Generating Developments (TfNSW Guide). However, service bays requirements discussed in TfNSW Guide are based on City of Sydney's surveys undertaken in 1972. Hence, we refer to the City of Sydney DCP 2012 Schedule 7, which states the following regarding the parking provision for service vehicles within a mixed-use development:

> *"The total number of service vehicle spaces for mixed-use developments are to be calculated on a pro-rata basis of spaces required for the relative proportions of different uses within the building".*

In this regard, the service vehicle requirement for different components is calculated as outlined below:

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5.3.1 Retail Component

The City of Sydney DCP Schedule 7, states the following rates for shops and shopping centres:

- 1 space per 350m², or part thereof, up to 2,000m²; then
- 1 space per 8,000 m² GFA thereafter.

Application of the above rates to the proposed 780m² of retail GFA, results in the minimum requirement for three (3) service vehicle spaces.

5.3.2 Childcare Component

The childcare component is considered to have minor servicing requirements and can be undertaken with light vehicles in a childcare parking space outside of peak drop-off and pick-up periods.

5.3.3 Residential Component

The City of Sydney DCP Schedule 7, states the following rates for the residential buildings:

- 1 space for the first 50 dwellings or serviced apartments; plus
- 0.5 spaces for every 50 dwellings/serviced apartments or part thereafter.

Application of the above rates to the proposed 370 residential dwellings, results in the minimum requirement for five (5) service vehicle spaces.

5.3.4 Overall Service Vehicle Requirements

In summary, the minimum service vehicle parking requirement for the mixed-use development is outlined in **Table 5** below.

TRAFFIX

Table 5 – Overall Service Vehicle Requirement

Type	GFA/ No of Units[1]	Service Bay Rate	Requirement
Retail (shops)	780m²	1 space per 350m² GFA, or part thereof, for the first 2,000m²; then 1 space per 8,000m² GFA Thereafter.	3
Residential	370	1 space for the first 50 dwellings or serviced apartments; plus 0.5 spaces for every 50 dwellings/serviced apartments of part thereafter	5
		Total	**8**

[1]*Yeilds are indicative and are subject to change at a later DA stage.*

The above requirement assumes independent provision for each land use component (a cumulative assessment) and therefore takes no account of a 'managed approach', with shared loading arrangements subject to a loading dock management plan. It also does not reflect the likely operational requirements of the proposed uses.

As such, it is concluded that the site is sufficiently large enough to accommodate sufficient loading/servicing spaces (in conjunction with a loading dock management plan) for any future development permissible under the Planning Proposal.

5.4 Bicycle Parking

Council's DCP specifies the following rates for bicycle parking:

- Retail developments: 1 space per 250m² GFA for employees.
  1 space per 500m² of GFA for visitors.
- Childcare: 0.2 spaces per parking space.
- Residential flat developments: 1 space per dwelling for residents.
  1 space per 10 dwellings for visitors.

Accordingly, the bicycle parking required under the DCP is a total of 418 parking spaces.

It is concluded that the site is sufficiently large enough to accommodate the required bicycle parking provision for any future development permissible under the Planning Proposal.

5.5 Motorcycle Parking

Council's DCP does specify a minimum motorcycle parking rate in relation to the uses contained within the concept development. Accordingly, motorcycle parking will be addressed at a future DA stage.

5.6 Car Wash Bay

The DCP does not specify a minimum requirement for car wash bays, however, it states that a car wash bay may also be a visitor space. This provision can be addressed at a future DA stage.

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6. TRAFFIC AND TRANSPORT IMPACTS

6.1 Development Trip Generation

The concept development includes retail, childcare, and residential components and would be classified as a mixed-use development. As such, each use has been assessed individually to determine the combined traffic generation of the concept development in accordance with the requirements of the TfNSW Guideline to Traffic Generating Developments 2002 (TfNSW Guide). The result of this assessment is summarised below.

6.1.1 Retail Component

The TfNSW Guide specifies the following trip rates for speciality retail shops that are not primary attractors to the centre. Whilst the Guide does not provide an AM trip rate, it is estimated to be 30% of the PM rate, representing staff arrivals:

- 1.4 vehicle trips per 100m² GLFA during the AM peak period;
- 4.6 vehicle trips per 100m² GLFA during the PM peak period; and
- 10.7 vehicle trips per 100m² GLFA during the Weekend peak period.

Based on the surveyed rates outlined above, the 585m² of retail GLFA (75% of GFA) the following trip generation results:

- 8 vehicle trips per hour during the AM peak (8 in, 0 out);
- 27 vehicle trips per hour during the PM peak (14 in, 13 out); and
- 63 vehicle trips per hour during the Weekend peak (32 in, 31 out).

6.1.2 Childcare Component

The TfNSW Guide provides traffic generation rates for the childcare centre (long-day care) at a recommended rate of 0.8 and 0.7 vehicle trips per child during the morning and evening peak periods, respectively. Application of these rates to the proposed 120 children and adopting an 50/50 directional split, results in the following traffic generation:

- 96 vehicle trips per hour during the AM peak (48 in, 48 out); and

- 84 vehicle trips per hour during the PM peak (42 in, 42 out).

Furthermore, based on TfNSW Guidelines it is noted that trips to childcare centres are typically 'linked trips' whereby a driver already accounted for on the network (travelling to a destination such as work or a school for an older sibling) will simply divert to the centre either to drop-off or pick-up a child. It would also be expected that a portion of enrolments live within the 370 residential dwellings within the development. As such, a 10% reduction is adopted for the above trips, resulting in the following:

- 86 vehicle trips per hour during the AM peak (43 in, 43 out); and
- 76 vehicle trips per hour during the PM peak (38 in, 38 out).

6.1.3 Residential Component

The TfNSW Technical Direction (TDT) 2013/04a provides traffic generation rates for high density residential flat buildings. It is noted that the surveys included a residential site in Parramatta (Site 5 of survey) and this data will be utilised for the purpose of this assessment. The traffic generation rates for the Parramatta site are as follows:

- 0.27 vehicle trips per unit during the AM peak period;
- 0.12 vehicle trips per unit during the PM peak period; and
- 0.22 vehicle trips per unit during the Weekend peak period.

Application of the above trip rates to the proposed 370 residential units, and adopting an 80/20 directional split, results in the following traffic generation:

- 100 vehicle trips per hour during the AM peak period (20 in, 80 out);
- 44 vehicle trips per hour during the PM peak period (35 in, 9 out); and
- 81 vehicle trips per hour during the Weekend peak (16 in, 65 out).

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6.1.4 Combined Generation

The combined generation of the mixed-use development can be summarised as follows:

Weekday

- 204 vehicle trips per hour during the AM peak period (76 in, 128 out); and
- 155 vehicle trips per hour during the PM peak period (91 in, 64 out).

Weekend

- 144 vehicle trips per hour during the Weekend peak (48 in, 96 out).

6.2 Trip Distribution

The Albert Street vehicular access is restricted to left-in and right-out movements. Accordingly, the above combined vehicle trips were distributed at the following key intersections, taking into consideration turn restrictions at each intersection:

Departures

- 33% of vehicles depart towards the north along O'Connell Street;
- 33% of vehicles depart towards the east along Albert Street. These vehicles will continue east onto Pennant Hills Road; and
- 33% of vehicles depart towards the south along O'Connell Street.

Arrivals

- 33% of vehicles arrive from the south along O'Connell Street;
- 67% of vehicles arrive from the east along Albert Street. 33% of these vehicles arrived via Pennant Hills Road.

6.3 Base Traffic Volumes

It should be noted that the Parramatta Light Rail is still under construction at the time of preparing this report, and as such, in order to undertake SIDRA Modelling, the following traffic volume data sources were utilised:

- The *Parramatta Light Rail Operational Traffic and Transport Technical Assessment Report (2017)* prepared by GTA Consultants. The 2026 post construction intersection volumes were utilised for the weekday base case, noting they also included forecasted light rail movements. The forecasted future traffic demands were reviewed by a multi-agency working group and endorsed by the Greater Sydney Commission.
- Intersection vehicle counts undertaken on Saturday 26 November 2022 were utilised for the weekend base case. It is noted that the GTA report did not considered weekend volumes.

6.4 Scenarios

In order to assess the potential traffic impacts of a proposed development, the following scenarios were identified:

- 2026 Weekday Base Case;
- 2026 Weekday Base Case + Development;
- 2022 Weekend Base Case; and
- 2022 Weekend Base Case + Development.

6.5 SIDRA Intersection Analysis

The surveys were analysed using the SIDRA Intersection 9.1 computer program to determine their performance characteristics under existing traffic conditions. The SIDRA model produces a range of outputs, the most useful of which are the Degree of Saturation (DoS) and Average Vehicle Delay per vehicle (AVD). The AVD is in turn related to a level of service (LoS) criteria. These performance measures can be interpreted using the following explanations:

DoS the DoS is a measure of the operational performance of individual intersections. As both queue length and delay increase rapidly as DoS approaches 1, it is usual to attempt to keep DoS to less than 0.9. When DoS exceeds 0.9 residual queues can be anticipated, as occurs at many major intersections throughout the metropolitan area during peak periods. In this regard, a practical limit at 1.1 can be assumed. For intersections controlled by roundabout or give way / stop control, satisfactory intersection operation is generally indicated by a DoS of 0.8 or less.

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AVD the AVD for individual intersections provides a measure of the operational performance of an intersection. In general, levels of acceptability of AVD for individual intersections depend on the time of day (motorists generally accept higher delays during peak commuter periods) and the road system being modelled (motorists are more likely to accept longer delays on side streets than on the main road system).

LoS this is a comparative measure which provides an indication of the operating performance of an intersection as shown in **Table 6**.

Table 6 – Intersection Performance Indicators (TfNSW)

Level of Service (LoS)	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way and Stop Signs
A	less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode	At capacity and requires other control mode
F	More than 70	Unsatisfactory and requires additional capacity.	Unsatisfactory and requires other control mode or major treatment.

A summary of the modelled results is provided in **Table 7** and **Table 8** for the 2026 weekday and 2022 weekend scenarios, respectively. Reference should also be made to the SIDRA outputs provided in **Appendix B** which provide detailed results for each movement.

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Table 7 – Intersection Performance for 2026 Weekday Scenario

Intersection	Control Type	Scenario	Period	Degree of Saturation (DoS)	Intersection Delay	Level of Service
Albert Street and O'Connell Street	Signalised	2026 Base	AM	0.516	21.0	B
			PM	0.630	22.5	B
		2026 Base + Development	AM	0.569	24.2	B
			PM	0.638	24.2	B
Albert Street, Church Street and Pennant Hills Road	Signalised	2026 Base	AM	0.716	23.1	B
			PM	0.842	23.3	B
		2026 Base + Development	AM	0.733	23.2	B
			PM	0.855	21.7	B

Table 8 – Intersection Performance for 2022 Weekend Scenario

Intersection	Control Type	Scenario	Period	Degree of Saturation (DoS)	Intersection Delay	Level of Service
Albert Street and O'Connell Street	Signalised	2022 Base	Peak	0.497	19.6	B
		2022 Base + Development		0.498	21.5	B
Albert Street, Church Street and Pennant Hills Road	Signalised	2022 Base	Peak	0.368	18.9	B
		2022 Base + Development		0.388	19.3	B

6.5.1 2026 Weekday Base Case + Development Performance

It can be seen from Table 7 that the Albert Street and O'Connell Street intersection experiences no reduction in Level of Service (LoS) as a result of the proposed concept development. The AM and PM peak periods see a minor increase in average delay in both peaks.

The Albert Street, Church Street and Pennant Hills Road intersection will continue to operate at a LoS 'B' during both peak periods, with minimal changes to intersection delay. This is considered acceptable, with both intersections operating good with acceptable delays and spare capacity, hence no external improvements are required to support the proposed concept development.

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6.5.2 2022 Weekend Base Case + Development Performance

It can be seen from Table 8 that the Albert Street and O'Connell Street intersection experiences no reduction in LoS as a result of the proposed concept development. The peak period will experience a minor increase in average delay of 1.9 seconds.

The Albert Street, Church Street and Pennant Hills Road intersection will continue to operate at a LoS 'B' during the weekend peak period. The peak period will experience a minor increase in average delay of 0.4 seconds. Again, this is considered acceptable, with both intersections operating good with acceptable delays and spare capacity, hence no external improvements are required to support the proposed concept development.

6.5.3 Signal Phasing

In light of the above, this SIDRA assessment and associated outputs are considered conservative and a worse case snapshot of actual conditions occurring at the sites, given that these intersections are 'SCATS' linked, thus are capable of 'live' signal adjustments to further optimise traffic flows along O'Connell Street and Church Street. Accordingly, no external road upgrades or changes to signal phasing are required to support the proposed development.

6.6 Sustainable Transport

The Parramatta City Council Development Control Plan (DCP) 2011; Part 3.6.1 Sustainable Transport, outlines the strategic goal of increasing sustainable transport. The encouragement of these alternative modes of transport will assist in reducing private vehicle trips, thus decreasing congestion, time, money, and environmental impacts. Due to this, the aim of the proposed development is to encourage and support the existing and future sustainable transport services available within the vicinity of the site. This can be achieved by providing the residents/workers of the proposed developments car share parking, bicycle parking, end of trip facilities and travel plans.

6.6.1 Green Travel Plan

In accordance with the DCP 2011 Part 3.6.1 (P.1), a Green Travel Plan (GTP) will be prepared for new developments, since the proposed development is within 800 meters of a railway station or 400 meters of a bus stop with a regular service frequency. This GTP will provide a site-

specific set of measures and initiatives to promote sustainable transport options such as walking, cycling, car sharing and public transport. It will assist in encouraging the residents/workers of the proposed development to use these options to replace all or part of their car journeys. The implementation of the GTP is expected to create a number of social, economic, environmental and health benefits for the residents. This GTP will comprise of the following:

- Targets – generally includes the reduction of single occupant car trips to and/or from the proposed development for journey to work.
- Travel Data – a prior estimate of the amount and types of trips to the proposed development is required, as well as an annual travel survey and review in order to estimate the change in travel behaviour of the residents.
- Measures – an outline of specified tools and methods to achieve goals.

Noting the above requirements, reference is made to the Preliminary Green Travel Plan prepared by TRAFFIX (Ref: 21.564r02v01) which outlines the initiatives and strategies to reduce private vehicle trips and encourage alternative modes of transport.

TRAFFIX

7. ACCESS AND INTERNAL DESIGN ASPECTS

7.1 Light Vehicle Access

The development proposes a total of 445 parking spaces with access to Albert Street, a local access road. Under AS 2890.1 (2004) the concept development will nominally require a Category 4 access, being a separated entry of width 6.0-8.0m and an exit width of 6.0-8.0m separated by a median providing a minimum width of 1.0-3.0m. It should be noted that the 6.0-8.0m entry and exit widths are to provide simultaneously vehicle movements for left/right movements to/from the site. Albert Street terminates west of the access and as such, no vehicles can approach or leave the site from this direction. As such a single lane for both entry and exit separated by a median is considered suitable and appropriate in this instance.

7.2 Heavy Vehicle Access

The development proposes a loading dock area with access to Albert Street, a local access road. This access driveway will accommodate vehicles up to a 12.5m heavy rigid vehicle, and as such, will be designed to accommodate this vehicle at a future DA stage.

7.3 Internal Design

The internal car park will comply with the requirements of AS 2890.1 (2004), AS 2890.2 (2018) and AS 2890.6 (2009), and the following characteristics are noteworthy:

7.3.1 Parking Modules

- All residential car parking spaces are to be designed in accordance with AS 2890.1 (2004) User Class 1A, being a minimum width of 2.4m, a minimum length of 5.4m and a minimum aisle width of 5.8m.
- All retail and childcare parking spaces are to be designed in accordance with AS 2890.1 (2004) User Class 3, being a minimum width of 2.6m, a minimum length of 5.4m and a minimum aisle width of 5.8m.

- All accessible parking spaces are to be designed in accordance with AS 2890.6 (2022), being 2.4m wide, 5.4m long and located adjacent to a dedicated shared area of the same dimensions.
- All spaces located adjacent to obstructions of greater than 150mm in height are to be provided with an additional width of 300mm.
- Dead-end aisles are to be provided with the required 1.0m aisle extension in accordance with AS 2890.1 (2004).

7.3.2 Vehicle Ramps

- All vehicle ramps accessed by retail visitors to have a maximum gradient of 20% (1 in 5) for up to 20m, with a minimum 2.0m transition at 12.5% (1 in 8), in accordance with the public car park requirements of AS 2890.1 (2004).
- All vehicle ramps accessed by residents/employees to have a maximum gradient of 25% (1 in 4) for up to 20m, with a minimum 2.0m transition at 12.5% (1 in 8), in accordance with the residential car park requirements of AS 2890.1 (2004).
- The access driveway is to have a maximum gradient of 1:20 (5%) extending from the property boundary line for at least 6.0m in accordance with AS 2890.1 (2004).

7.3.3 Clear Head Heights

- A minimum clear head height of 2.2m is to be provided for all areas within the basement car park as required by AS 2890.1 (2004).
- A minimum clear head height of 2.5m is to be provided above all accessible spaces in accordance with AS 2890.6 (2022).
- Head height clearances for roadways/loading docks accessed by service vehicles are to be provided in accordance with Table 2.1 of AS 2890.2 (2018).

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7.3.4 Other Considerations

- All columns are to be located outside of the parking space design envelope shown in Figure 5.2 of AS 2890.1 (2004).
- Visual splays are to be provided at the access driveway in accordance with Figure 3.3 of AS 2890.1 (2004).

7.4 Summary

In summary, the internal configuration of the car park/loading bays should be designed in accordance with AS 2890.1 (2004), AS 2890.2 (2018) and AS 2890.6 (2022). The car parking and service bay arrangements can be further optimised during future DA stage/s.

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8. CONCLUSIONS

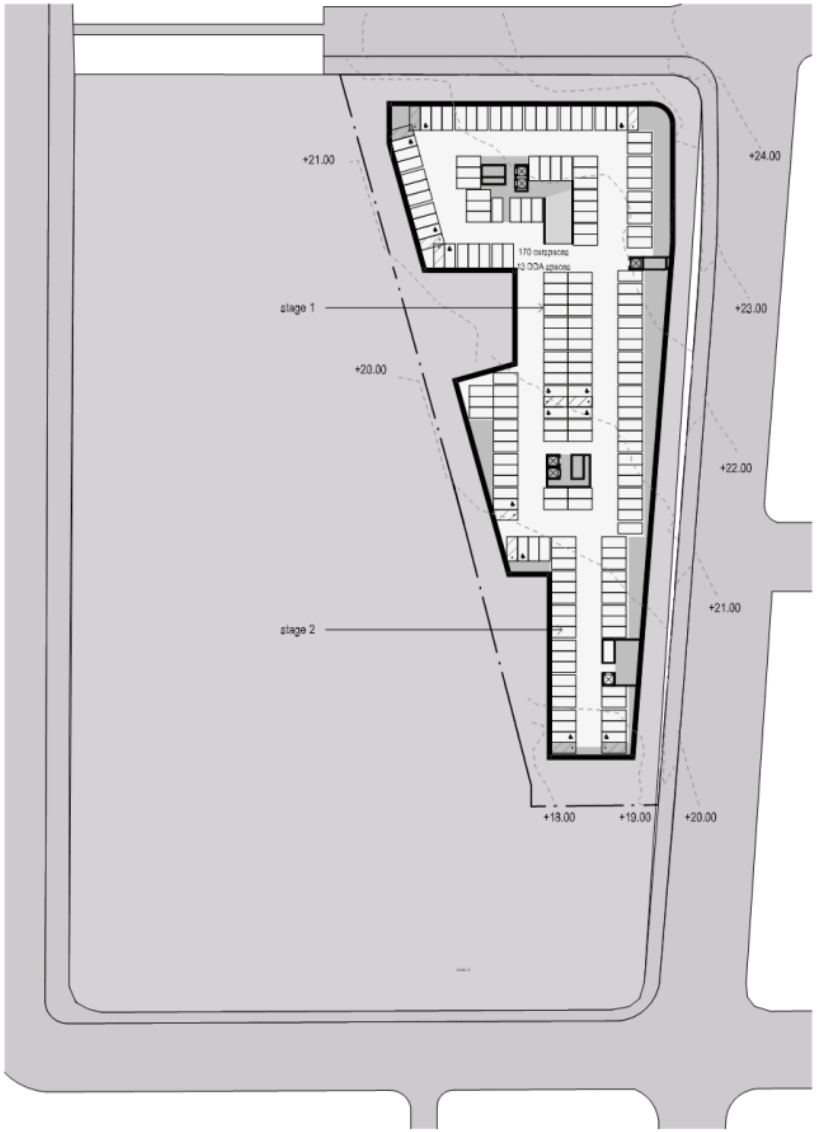
The following matters are noteworthy:

- The planning proposal seeks approval to vary the floor space ratio and height controls for the site at 9 Albert Street and 31 O'Connell Street, North Parramatta. A concept scheme has been assessed which is representative of the site being developed to its full potential with these proposed changes, comprising a 780m² GFA retail, a childcare centre accommodating 120 children, 370 residential apartments, and two (2) levels of basement carparking accommodating approximately 440 car parking spaces.
- The subject site is well connected to the public transport network with reliable access to regular bus and future light rail services. These, along with existing pedestrian and cycle links, ensure the site is ideally situated for a mixed-use development as it provides a good opportunity to encourage future tenants, customers, and staff to use sustainable transport modes.
- The concept scheme has been assessed to require 435 parking spaces under the SEPP 65 and Paramatta DCP 2023. In response, concept plans indicate provision for 440 parking spaces within two (2) basements levels, thus demonstrating that the site is sufficiently large enough to accommodate the parking demands for a future development.
- The traffic generation arising from the development has been assessed as a net increase over existing conditions and equates to an additional 204 vehicle trips during the weekday morning peak period and 155 vehicle trips during the weekday evening peak period. Notwithstanding, SIDRA modelling of the intersections of Albert Street/O'Connell Street and Albert Street/Church Street/Pennant Hills Road demonstrate negligible increases in delays. Accordingly, these intersections will continue to operate at a satisfactory level of service with spare capacity.

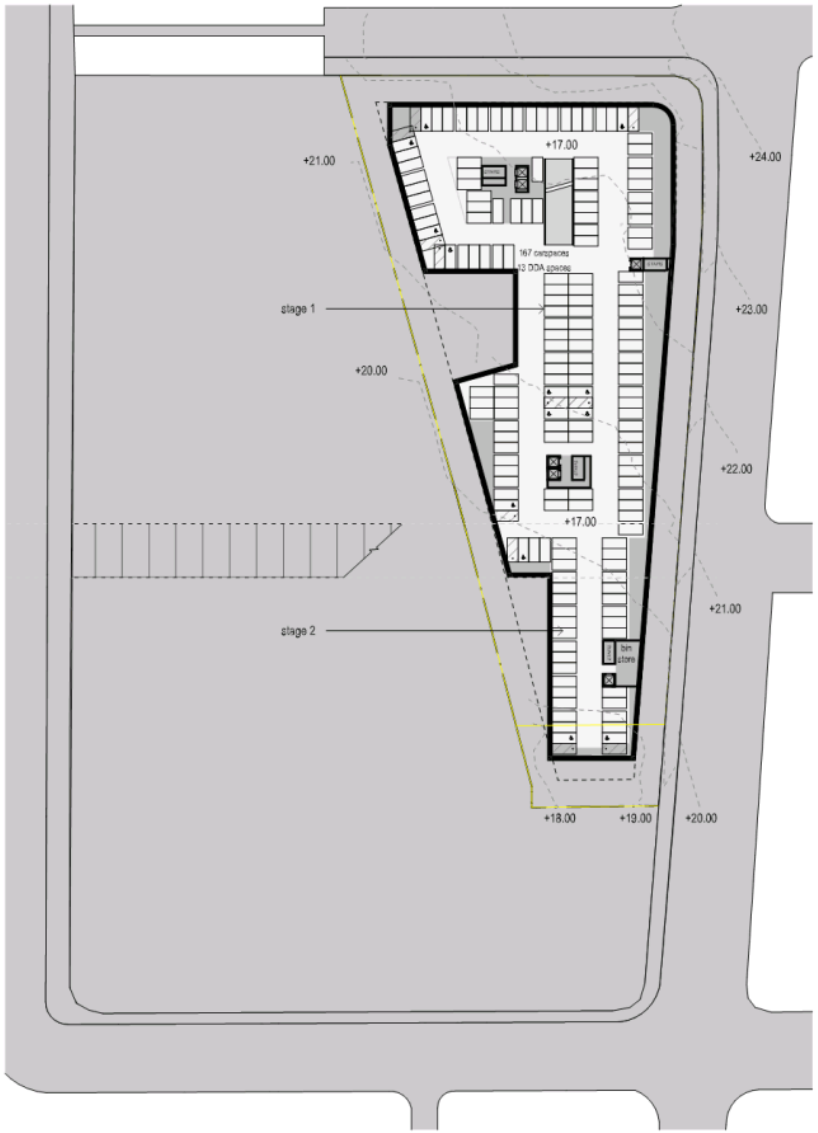
This traffic impact assessment therefore demonstrates that the subject Planning Proposal is supportable on traffic planning grounds. TRAFFIX anticipates an ongoing involvement during the planning proposal approval process.

APPENDIX A

Urban Design Report



BASEMENT 02



BASEMENT 01

DKO ARCHITECTURE

0 10 20 30 40 50m

9 Albert Street & 31 O'Connell Street, North Parramatta

PREPARED FOR: Council RFI

PROJECT #13387

2/6/2024

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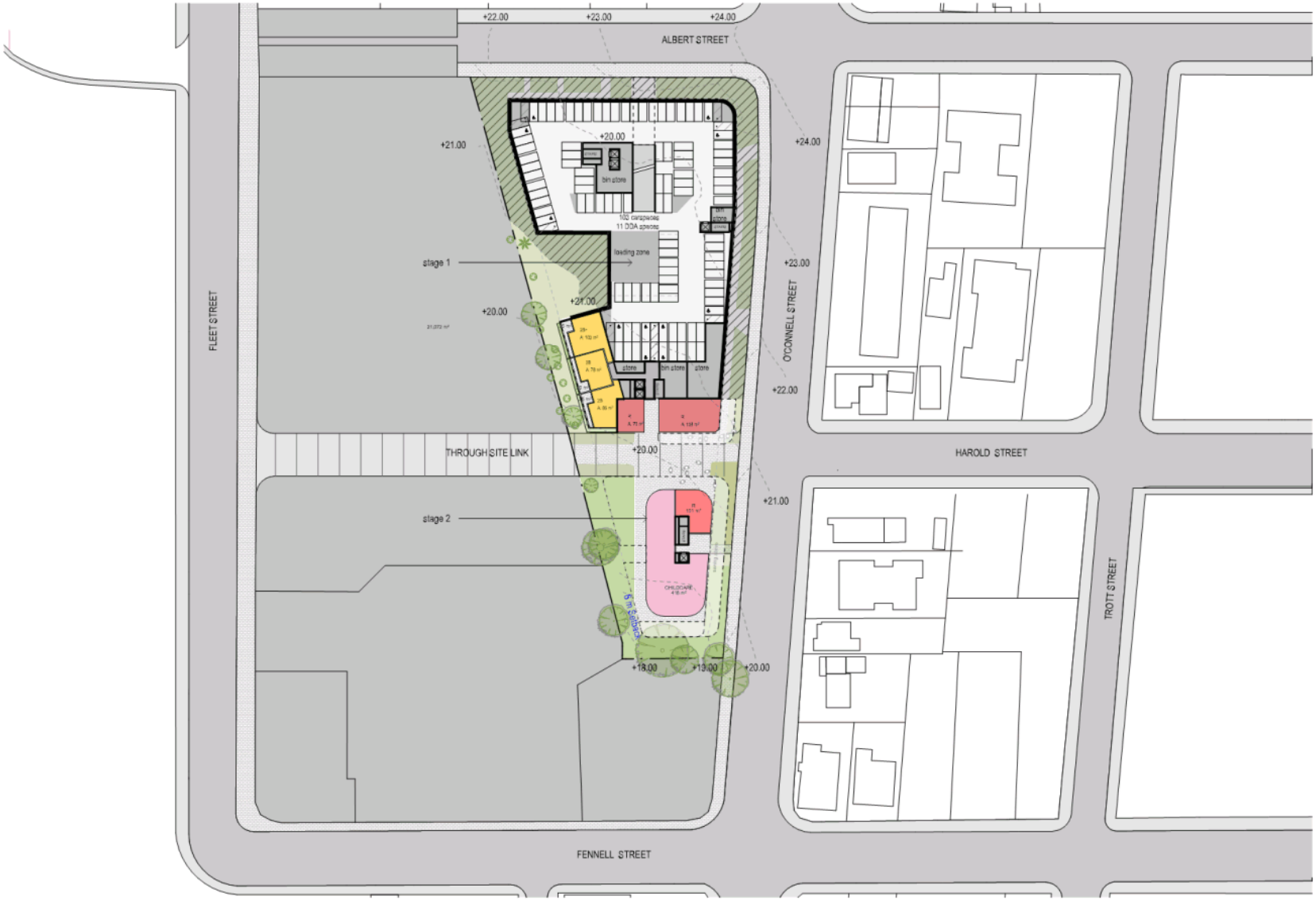

LOWER GROUND FLOOR

DKO ARCHITECTURE | 0 10 20 30 40 50m | 9 Albert Street & 31 O'Connell Street, North Parramatta | PREPARED FOR: Council RFI | PROJECT #13387 | 2/6/2024 PAGE 2

DKO ARCHITECTURE

0 10 20 30 40 50m

9 Albert Street & 31 O'Connell Street, North Parramatta

PREPARED FOR: Council RFI

PROJECT #13387

2/6/2024

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APPENDIX B

SIDRA Outputs

USER REPORT FOR SITE

Project: 21.564m01v03 **Template: Layouts**

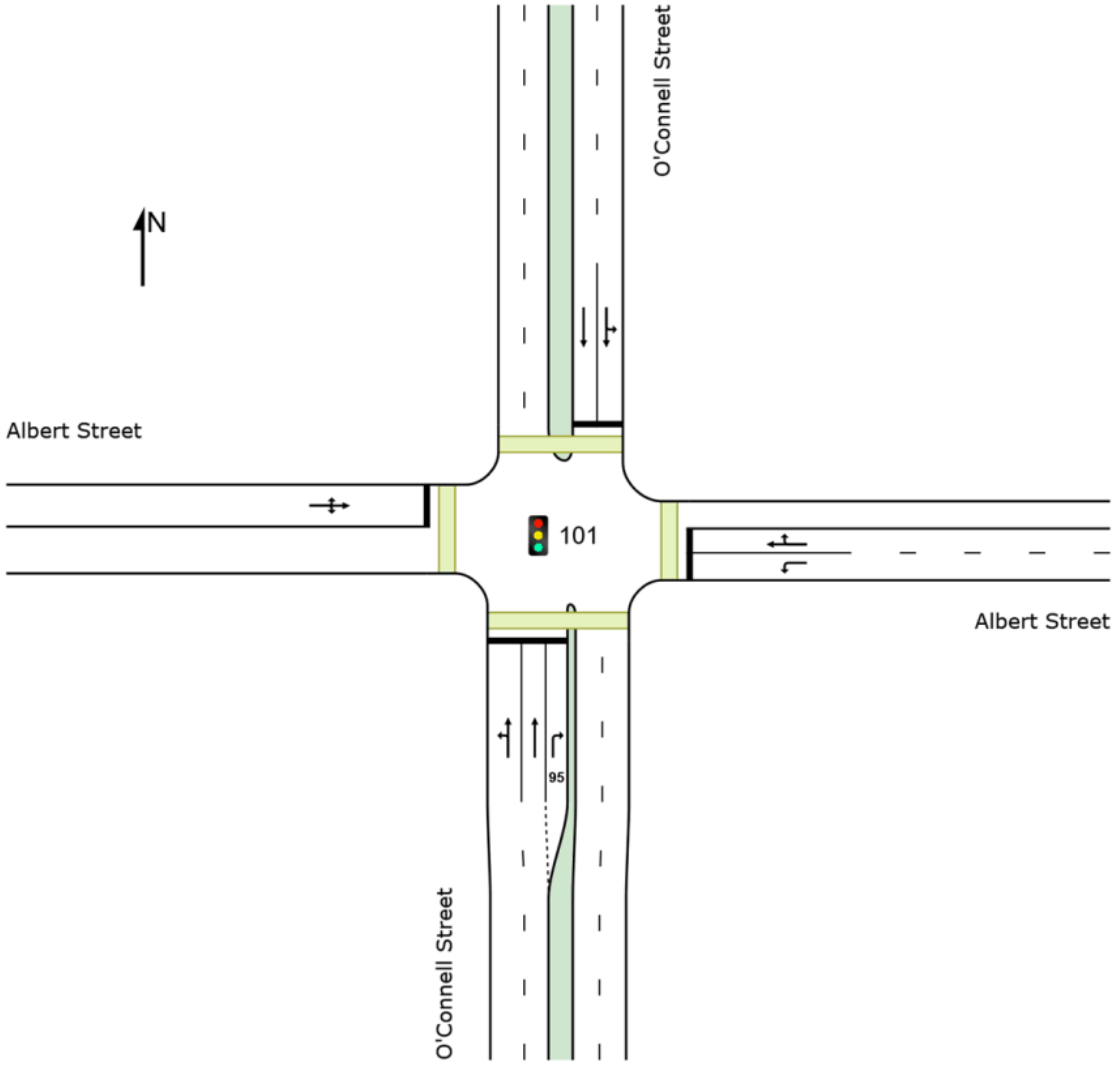
Site: 101 [Existing AM - Albert St / O'Connell St (Site Folder: Weekday Existing 2026 Scenario)]

Albert Street & O'Connell Street Intersection
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: TCS
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C
Reference Phase: Phase A

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Site: 101 [Existing AM - Albert St / O'Connell St (Site Folder: Weekday Existing 2026 Scenario)]

Albert Street & O'Connell Street Intersection
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 130 seconds (Site Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: TCS
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C
Reference Phase: Phase A

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: O'Connell Street															
1	L2	All MCs	2	0.0	2	0.0	0.248	10.6	LOS A	6.7	49.9	0.33	0.29	0.33	45.6
2	T1	All MCs	691	8.1	691	8.1	0.248	5.1	LOS A	6.7	49.9	0.33	0.29	0.33	53.9
3	R2	All MCs	264	9.2	264	9.2	*0.516	31.7	LOS C	13.5	101.6	0.88	0.88	0.88	28.5
Approach			957	8.4	957	8.4	0.516	12.4	LOS A	13.5	101.6	0.48	0.45	0.48	45.1
East: Albert Street															
4	L2	All MCs	299	4.6	299	4.6	0.413	34.5	LOS C	13.5	98.2	0.77	0.78	0.77	27.0
5	T1	All MCs	2	0.0	2	0.0	*0.241	53.1	LOS D	3.2	23.0	0.92	0.75	0.92	14.0
6	R2	All MCs	55	1.9	55	1.9	0.241	57.7	LOS E	3.2	23.0	0.92	0.75	0.92	22.6
Approach			356	4.1	356	4.1	0.413	38.2	LOS C	13.5	98.2	0.79	0.78	0.79	26.1
North: O'Connell Street															
7	L2	All MCs	27	30.8	27	30.8	0.516	28.6	LOS C	20.3	149.6	0.72	0.65	0.72	34.4
8	T1	All MCs	947	4.8	947	4.8	*0.516	22.6	LOS B	20.3	149.6	0.72	0.64	0.72	39.8
Approach			975	5.5	975	5.5	0.516	22.8	LOS B	20.3	149.6	0.72	0.64	0.72	39.6
West: Albert Street															
10	L2	All MCs	3	0.0	3	0.0	0.044	55.3	LOS D	0.6	4.0	0.88	0.66	0.88	20.9
11	T1	All MCs	3	0.0	3	0.0	0.044	50.7	LOS D	0.6	4.0	0.88	0.66	0.88	14.8
12	R2	All MCs	4	0.0	4	0.0	0.044	55.3	LOS D	0.6	4.0	0.88	0.66	0.88	18.4
Approach			11	0.0	11	0.0	0.044	53.9	LOS D	0.6	4.0	0.88	0.66	0.88	18.2
All Vehicles			2298	6.5	2298	6.5	0.516	21.0	LOS B	20.3	149.6	0.63	0.58	0.63	38.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Site: 101 [Existing PM - Albert St / O'Connell St (Site Folder: Weekday Existing 2026 Scenario)]

Albert Street & O'Connell Street Intersection
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: TCS
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C
Reference Phase: Phase A

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: O'Connell Street															
1	L2	All MCs	3	0.0	3	0.0	0.329	11.4	LOS A	9.5	68.7	0.38	0.34	0.38	44.4
2	T1	All MCs	915	3.9	915	3.9	0.329	5.9	LOS A	9.5	68.7	0.38	0.34	0.38	53.0
3	R2	All MCs	346	4.9	346	4.9	* 0.498	31.0	LOS C	13.8	100.6	0.80	0.91	0.80	28.8
Approach			1264	4.2	1264	4.2	0.498	12.8	LOS A	13.8	100.6	0.49	0.49	0.49	44.8
East: Albert Street															
4	L2	All MCs	267	6.7	267	6.7	0.277	20.3	LOS B	8.3	61.4	0.58	0.72	0.58	33.6
5	T1	All MCs	4	0.0	4	0.0	* 0.338	48.6	LOS D	4.7	32.8	0.93	0.77	0.93	14.9
6	R2	All MCs	84	0.0	84	0.0	0.338	53.2	LOS D	4.7	32.8	0.93	0.77	0.93	23.7
Approach			356	5.0	356	5.0	0.338	28.5	LOS B	8.3	61.4	0.66	0.73	0.66	30.0
North: O'Connell Street															
7	L2	All MCs	43	4.9	43	4.9	0.630	39.9	LOS C	20.1	149.9	0.89	0.78	0.89	29.5
8	T1	All MCs	785	7.8	785	7.8	* 0.630	34.3	LOS C	20.1	149.9	0.89	0.78	0.89	33.8
Approach			828	7.6	828	7.6	0.630	34.6	LOS C	20.1	149.9	0.89	0.78	0.89	33.6
West: Albert Street															
10	L2	All MCs	1	0.0	1	0.0	0.027	49.9	LOS D	0.3	2.2	0.86	0.64	0.86	22.1
11	T1	All MCs	1	0.0	1	0.0	0.027	45.3	LOS D	0.3	2.2	0.86	0.64	0.86	15.8
12	R2	All MCs	4	0.0	4	0.0	0.027	49.9	LOS D	0.3	2.2	0.86	0.64	0.86	19.5
Approach			6	0.0	6	0.0	0.027	49.1	LOS D	0.3	2.2	0.86	0.64	0.86	19.4
All Vehicles			2455	5.4	2455	5.4	0.630	22.5	LOS B	20.1	149.9	0.65	0.63	0.65	37.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

MOVEMENT SUMMARY

Site: 101 [Existing + Development AM - Albert St / O'Connell St (Site Folder: Weekday Existing (2026) + Development Scenario)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Albert Street & O'Connell Street Intersection
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: O'Connell Street															
1	L2	All MCs	28	0.0	28	0.0	0.274	12.2	LOS A	7.7	57.1	0.39	0.37	0.39	43.0
2	T1	All MCs	691	8.1	691	8.1	0.274	6.7	LOS A	7.7	57.1	0.39	0.36	0.39	52.0
3	R2	All MCs	264	9.2	264	9.2	* 0.569	36.4	LOS C	12.8	96.6	0.92	0.92	0.92	26.6
Approach			983	8.1	983	8.1	0.569	14.8	LOS B	12.8	96.6	0.53	0.51	0.53	43.0
East: Albert Street															
4	L2	All MCs	299	4.6	299	4.6	0.389	30.0	LOS C	11.9	86.9	0.74	0.77	0.74	28.8
5	T1	All MCs	56	0.0	56	0.0	0.406	46.8	LOS D	5.9	41.8	0.94	0.77	0.94	15.2
6	R2	All MCs	55	1.9	55	1.9	0.406	56.3	LOS D	5.9	41.8	0.94	0.77	0.94	24.1
Approach			409	3.6	409	3.6	0.406	35.8	LOS C	11.9	86.9	0.79	0.77	0.79	26.1
North: O'Connell Street															
7	L2	All MCs	27	30.8	27	30.8	0.566	30.0	LOS C	20.8	153.1	0.77	0.69	0.77	33.6
8	T1	All MCs	974	4.6	974	4.6	* 0.566	24.1	LOS B	20.8	153.1	0.77	0.69	0.77	38.9
Approach			1001	5.4	1001	5.4	0.566	24.2	LOS B	20.8	153.1	0.77	0.69	0.77	38.8
West: Albert Street															
10	L2	All MCs	48	0.0	48	0.0	0.547	53.1	LOS D	8.1	56.5	0.97	0.80	0.97	20.9
11	T1	All MCs	48	0.0	48	0.0	* 0.547	48.6	LOS D	8.1	56.5	0.97	0.80	0.97	14.8
12	R2	All MCs	49	0.0	49	0.0	0.547	59.3	LOS E	8.1	56.5	0.97	0.80	0.97	18.4
Approach			146	0.0	146	0.0	0.547	53.7	LOS D	8.1	56.5	0.97	0.80	0.97	18.2
All Vehicles			2540	5.8	2540	5.8	0.569	24.2	LOS B	20.8	153.1	0.69	0.64	0.69	36.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: O'Connell Street												
P1	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
East: Albert Street												
P2	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
North: O'Connell Street												
P3	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
West: Albert Street												
P4	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
All Pedestrians		200	211	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 101 [Existing + Development PM - Albert St / O'Connell St (Site Folder: Weekday Existing (2026) + Development Scenario)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Albert Street & O'Connell Street Intersection
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: O'Connell Street															
1	L2	All MCs	36	0.0	36	0.0	0.341	11.5	LOS A	9.9	71.8	0.38	0.37	0.38	43.9
2	T1	All MCs	915	3.9	915	3.9	0.341	6.0	LOS A	9.9	71.8	0.38	0.36	0.38	52.7
3	R2	All MCs	346	4.9	346	4.9	* 0.510	32.1	LOS C	14.0	102.1	0.81	0.92	0.81	28.4
Approach			1297	4.1	1297	4.1	0.510	13.1	LOS A	14.0	102.1	0.50	0.51	0.50	44.4
East: Albert Street															
4	L2	All MCs	267	6.7	267	6.7	0.281	20.9	LOS B	8.5	62.6	0.59	0.72	0.59	33.2
5	T1	All MCs	68	0.0	68	0.0	* 0.588	50.8	LOS D	8.5	59.7	0.98	0.80	0.98	14.6
6	R2	All MCs	84	0.0	84	0.0	0.588	57.4	LOS E	8.5	59.7	0.98	0.80	0.98	23.4
Approach			420	4.3	420	4.3	0.588	33.1	LOS C	8.5	62.6	0.73	0.75	0.73	27.1
North: O'Connell Street															
7	L2	All MCs	43	4.9	43	4.9	0.638	39.3	LOS C	20.8	154.8	0.89	0.78	0.89	29.7
8	T1	All MCs	817	7.5	817	7.5	* 0.638	33.7	LOS C	20.8	154.8	0.89	0.78	0.89	34.1
Approach			860	7.3	860	7.3	0.638	34.0	LOS C	20.8	154.8	0.89	0.78	0.89	33.9
West: Albert Street															
10	L2	All MCs	23	0.0	23	0.0	0.305	53.3	LOS D	3.9	27.2	0.93	0.75	0.93	21.0
11	T1	All MCs	23	0.0	23	0.0	0.305	48.7	LOS D	3.9	27.2	0.93	0.75	0.93	14.9
12	R2	All MCs	26	0.0	26	0.0	0.305	57.2	LOS E	3.9	27.2	0.93	0.75	0.93	18.5
Approach			73	0.0	73	0.0	0.305	53.3	LOS D	3.9	27.2	0.93	0.75	0.93	18.3
All Vehicles			2649	5.0	2649	5.0	0.638	24.2	LOS B	20.8	154.8	0.67	0.64	0.67	36.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: O'Connell Street												
P1	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
East: Albert Street												
P2	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
North: O'Connell Street												
P3	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
West: Albert Street												
P4	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
All Pedestrians		200	211	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Site: 101 [Existing PM - Albert St / O'Connell St (Site Folder: Weekend Existing 2022 Scenario)]

Albert Street & O'Connell Street Intersection
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: TCS
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C
Reference Phase: Phase A

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: O'Connell Street															
1	L2	All MCs	1	0.0	1	0.0	0.245	11.0	LOS A	6.5	47.1	0.35	0.31	0.35	45.1
2	T1	All MCs	684	3.2	684	3.2	0.245	5.5	LOS A	6.5	47.1	0.35	0.31	0.35	53.5
3	R2	All MCs	236	2.7	236	2.7	*0.348	22.8	LOS B	8.8	62.7	0.70	0.78	0.70	32.7
Approach			921	3.1	921	3.1	0.348	9.9	LOS A	8.8	62.7	0.44	0.43	0.44	47.4
East: Albert Street															
4	L2	All MCs	225	2.8	225	2.8	0.250	23.3	LOS B	7.5	53.9	0.62	0.73	0.62	32.0
5	T1	All MCs	1	0.0	1	0.0	*0.142	46.7	LOS D	1.9	13.1	0.89	0.72	0.89	15.2
6	R2	All MCs	36	0.0	36	0.0	0.142	51.2	LOS D	1.9	13.1	0.89	0.72	0.89	24.2
Approach			262	2.4	262	2.4	0.250	27.2	LOS B	7.5	53.9	0.66	0.73	0.66	30.4
North: O'Connell Street															
7	L2	All MCs	22	0.0	22	0.0	0.497	33.7	LOS C	16.6	119.2	0.79	0.70	0.79	32.2
8	T1	All MCs	746	3.0	746	3.0	*0.497	28.1	LOS B	16.6	119.2	0.79	0.70	0.79	36.7
Approach			768	2.9	768	2.9	0.497	28.3	LOS B	16.6	119.2	0.79	0.70	0.79	36.6
West: Albert Street															
10	L2	All MCs	3	0.0	3	0.0	0.018	49.3	LOS D	0.3	1.8	0.86	0.63	0.86	22.2
11	T1	All MCs	1	0.0	1	0.0	0.018	44.8	LOS D	0.3	1.8	0.86	0.63	0.86	15.9
12	R2	All MCs	1	0.0	1	0.0	0.018	49.3	LOS D	0.3	1.8	0.86	0.63	0.86	19.7
Approach			5	0.0	5	0.0	0.018	48.4	LOS D	0.3	1.8	0.86	0.63	0.86	20.6
All Vehicles			1957	2.9	1957	2.9	0.497	19.6	LOS B	16.6	119.2	0.61	0.57	0.61	39.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

MOVEMENT SUMMARY

Site: 101 [Existing + Development PM - Albert St / O'Connell St (Site Folder: Weekend Existing + Development Scenario)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Albert Street & O'Connell Street Intersection
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: O'Connell Street															
1	L2	All MCs	18	0.0	18	0.0	0.251	11.0	LOS A	6.7	48.4	0.35	0.33	0.35	44.7
2	T1	All MCs	684	3.2	684	3.2	0.251	5.5	LOS A	6.7	48.4	0.35	0.32	0.35	53.3
3	R2	All MCs	236	2.7	236	2.7	* 0.355	23.1	LOS B	8.9	63.6	0.71	0.78	0.71	32.6
Approach			938	3.0	938	3.0	0.355	10.0	LOS A	8.9	63.6	0.44	0.43	0.44	47.2
East: Albert Street															
4	L2	All MCs	225	2.8	225	2.8	0.255	24.0	LOS B	7.7	54.8	0.63	0.73	0.63	31.6
5	T1	All MCs	35	0.0	35	0.0	0.290	47.7	LOS D	3.7	26.1	0.92	0.74	0.92	15.2
6	R2	All MCs	36	0.0	36	0.0	0.290	55.1	LOS D	3.7	26.1	0.92	0.74	0.92	24.2
Approach			296	2.1	296	2.1	0.290	30.5	LOS C	7.7	54.8	0.70	0.73	0.70	28.2
North: O'Connell Street															
7	L2	All MCs	22	0.0	22	0.0	0.498	33.0	LOS C	16.8	120.6	0.79	0.70	0.79	32.5
8	T1	All MCs	763	2.9	763	2.9	* 0.498	27.5	LOS B	16.8	120.6	0.79	0.69	0.79	37.1
Approach			785	2.8	785	2.8	0.498	27.6	LOS B	16.8	120.6	0.79	0.69	0.79	36.9
West: Albert Street															
10	L2	All MCs	37	0.0	37	0.0	0.403	53.2	LOS D	5.7	39.9	0.94	0.77	0.94	21.3
11	T1	All MCs	35	0.0	35	0.0	* 0.403	48.6	LOS D	5.7	39.9	0.94	0.77	0.94	15.1
12	R2	All MCs	35	0.0	35	0.0	0.403	55.1	LOS D	5.7	39.9	0.94	0.77	0.94	18.7
Approach			106	0.0	106	0.0	0.403	52.3	LOS D	5.7	39.9	0.94	0.77	0.94	18.6
All Vehicles			2125	2.7	2125	2.7	0.498	21.5	LOS B	16.8	120.6	0.63	0.59	0.63	38.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: O'Connell Street												
P1	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
East: Albert Street												
P2	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
North: O'Connell Street												
P3	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
West: Albert Street												
P4	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
All Pedestrians		200	211	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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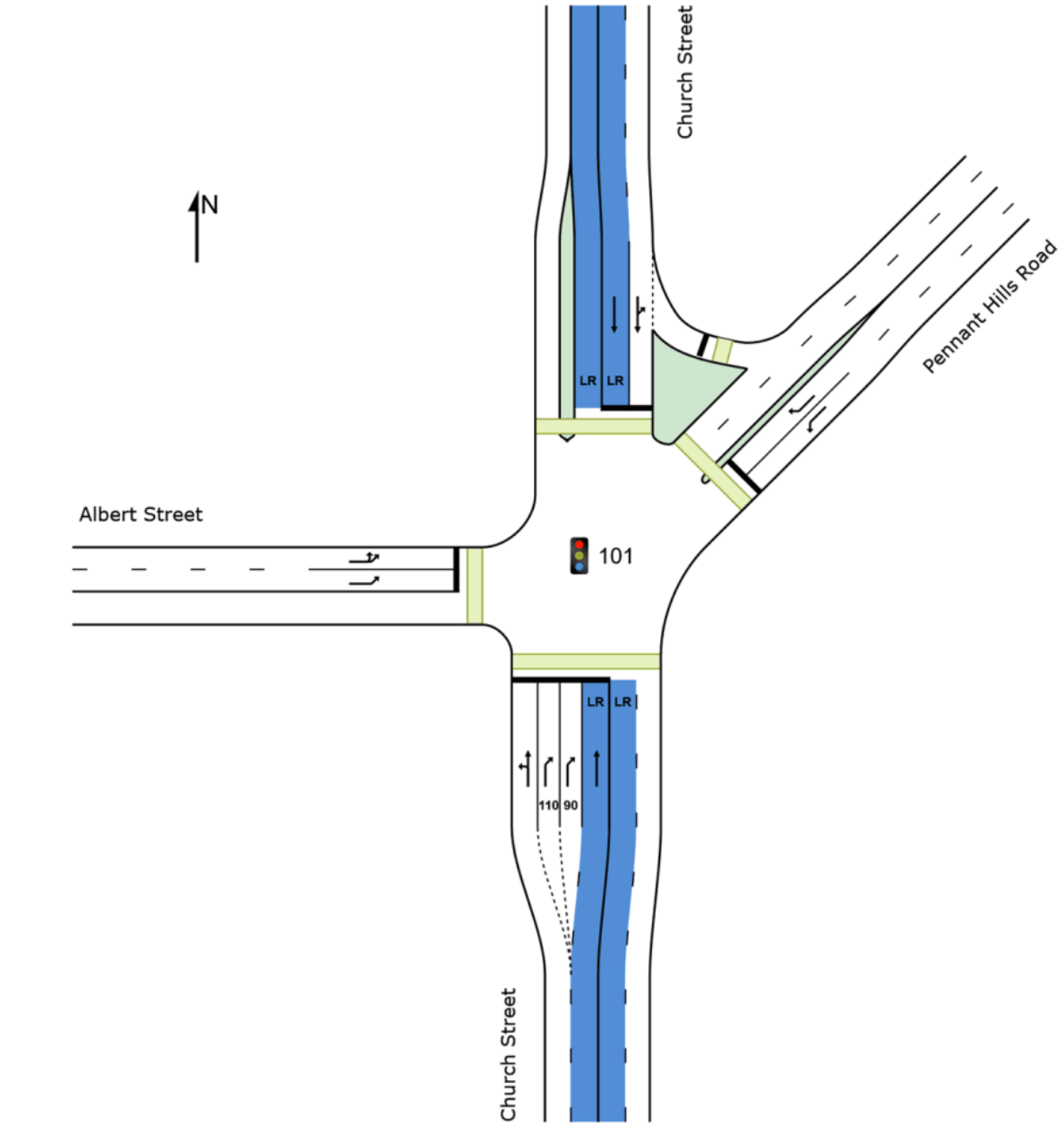
Site: 101 [Existing AM - Church St / Pennant Hills Rd / Albert St (Site Folder: Weekday Existing 2026 Scenario)]

Church Street & Pennant Hills Road & Albert Street Intersection
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Assumed Phasing
Input Phase Sequence: A, B, B1*, B2*, C, D, E*
Output Phase Sequence: A, C, D
Reference Phase: Phase A
(* Variable Phase)

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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Site: 101 [Existing AM - Church St / Pennant Hills Rd / Albert St (Site Folder: Weekday Existing 2026 Scenario)]

Church Street & Pennant Hills Road & Albert Street Intersection
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Assumed Phasing
Input Phase Sequence: A, B, B1*, B2*, C, D, E*
Output Phase Sequence: A, C, D
Reference Phase: Phase A
(* Variable Phase)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Church Street															
1	L2	All MCs	29	0.0	29	0.0	0.708	11.3	LOS A	11.2	84.7	0.37	0.35	0.37	43.0
2	T1	All MCs	540	10.8	540	10.8	* 0.708	6.3	LOS A	11.2	84.7	0.38	0.36	0.38	50.4
3a	R1	All MCs	266	2.7	266	2.7	0.462	44.9	LOS D	6.4	45.7	0.84	0.75	0.84	36.8
Approach			836	7.8	836	7.8	0.708	18.8	LOS B	11.2	84.7	0.53	0.48	0.53	42.4
NorthEast: Pennant Hills Road															
24a	L1	All MCs	34	25.4	34	25.4	0.031	11.6	LOS A	0.6	5.4	0.35	0.60	0.35	50.5
26a	R1	All MCs	632	0.1	632	0.1	* 0.716	31.6	LOS C	29.3	205.5	0.86	0.84	0.86	40.6
Approach			665	1.4	665	1.4	0.716	30.6	LOS C	29.3	205.5	0.84	0.83	0.84	41.0
North: Church Street															
7b	L3	All MCs	122	0.0	122	0.0	0.307	7.8	LOS A	2.1	15.9	0.32	0.57	0.32	51.7
8	T1	All MCs	56	46.2	56	46.2	0.307	20.9	LOS B	2.1	15.9	0.40	0.57	0.40	41.8
Approach			178	14.5	178	14.5	0.307	11.9	LOS A	2.1	15.9	0.35	0.57	0.35	49.8
West: Albert Street															
10	L2	All MCs	20	0.0	20	0.0	0.295	25.6	LOS B	9.1	64.9	0.66	0.70	0.66	32.5
10a	L1	All MCs	487	3.0	487	3.0	0.295	24.1	LOS B	9.1	65.1	0.66	0.69	0.66	43.3
Approach			507	2.9	507	2.9	0.295	24.1	LOS B	9.1	65.1	0.66	0.69	0.66	43.0
All Vehicles			2186	5.3	2186	5.3	0.716	23.1	LOS B	29.3	205.5	0.64	0.64	0.64	42.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Site: 101 [Existing PM - Church St / Pennant Hills Rd / Albert St (Site Folder: Weekday Existing 2026 Scenario)]

Church Street & Pennant Hills Road & Albert Street Intersection
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Assumed Phasing
Input Phase Sequence: A, B, B1*, B2*, C, D, E*
Output Phase Sequence: A, C, D
Reference Phase: Phase A
(* Variable Phase)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Church Street															
1	L2	All MCs	57	0.0	57	0.0	0.842	6.7	LOS A	6.3	45.5	0.12	0.15	0.13	49.0
2	T1	All MCs	839	5.1	839	5.1	* 0.842	1.5	LOS A	6.3	45.5	0.13	0.16	0.14	57.0
3a	R1	All MCs	462	2.2	462	2.2	0.660	41.3	LOS C	11.4	81.1	0.87	0.79	0.88	37.9
Approach			1358	3.9	1358	3.9	0.842	15.2	LOS B	11.4	81.1	0.38	0.37	0.39	44.9
NorthEast: Pennant Hills Road															
24a	L1	All MCs	36	28.1	36	28.1	0.039	16.0	LOS B	0.9	7.6	0.45	0.63	0.45	48.1
26a	R1	All MCs	535	0.0	535	0.0	* 0.827	47.4	LOS D	30.5	213.8	0.99	0.92	1.06	35.5
Approach			571	1.8	571	1.8	0.827	45.4	LOS D	30.5	213.8	0.95	0.90	1.02	36.1
North: Church Street															
7b	L3	All MCs	291	0.0	291	0.0	0.375	6.8	LOS A	0.4	2.6	0.03	0.54	0.03	54.3
8	T1	All MCs	53	58.0	53	58.0	0.375	5.9	LOS A	0.4	9.3	0.14	0.54	0.14	46.5
Approach			343	8.9	343	8.9	0.375	6.7	LOS A	0.4	9.3	0.05	0.54	0.05	53.6
West: Albert Street															
10	L2	All MCs	72	0.0	72	0.0	0.291	35.4	LOS C	7.8	55.1	0.77	0.74	0.77	27.9
10a	L1	All MCs	299	0.7	299	0.7	0.291	33.9	LOS C	7.9	55.7	0.77	0.74	0.77	39.4
Approach			371	0.6	371	0.6	0.291	34.2	LOS C	7.9	55.7	0.77	0.74	0.77	37.9
All Vehicles			2642	3.6	2642	3.6	0.842	23.3	LOS B	30.5	213.8	0.52	0.56	0.53	42.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

MOVEMENT SUMMARY

Site: 101 [Existing + Development AM - Church St / Pennant Hills Rd / Albert St (Site Folder: Weekday Existing (2026) + Development Scenario)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Church Street & Pennant Hills Road & Albert Street Intersection
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Church Street															
1	L2	All MCs	29	0.0	29	0.0	0.721	12.2	LOS A	12.7	95.4	0.42	0.39	0.42	41.9
2	T1	All MCs	540	10.8	540	10.8	*0.721	7.2	LOS A	12.7	95.4	0.42	0.39	0.42	49.3
3a	R1	All MCs	266	2.7	266	2.7	0.462	44.9	LOS D	6.4	45.7	0.84	0.75	0.84	36.8
Approach			836	7.8	836	7.8	0.721	19.4	LOS B	12.7	95.4	0.56	0.51	0.56	42.0
NorthEast: Pennant Hills Road															
24a	L1	All MCs	34	25.4	34	25.4	0.031	11.2	LOS A	0.6	5.3	0.34	0.60	0.34	50.7
26a	R1	All MCs	658	0.1	658	0.1	*0.733	31.3	LOS C	30.7	215.2	0.87	0.85	0.87	40.7
Approach			692	1.3	692	1.3	0.733	30.4	LOS C	30.7	215.2	0.84	0.84	0.84	41.1
North: Church Street															
7b	L3	All MCs	122	0.0	122	0.0	0.316	7.9	LOS A	2.1	15.7	0.33	0.57	0.33	51.7
8	T1	All MCs	56	46.2	56	46.2	0.316	20.7	LOS B	2.1	15.7	0.40	0.57	0.40	41.8
Approach			178	14.5	178	14.5	0.316	11.9	LOS A	2.1	15.7	0.35	0.57	0.35	49.8
West: Albert Street															
10	L2	All MCs	20	0.0	20	0.0	0.315	25.2	LOS B	9.8	70.4	0.66	0.70	0.66	32.7
10a	L1	All MCs	533	2.7	533	2.7	0.315	23.7	LOS B	9.9	70.6	0.66	0.70	0.66	43.4
Approach			553	2.6	553	2.6	0.315	23.8	LOS B	9.9	70.6	0.66	0.70	0.66	43.2
All Vehicles			2258	5.1	2258	5.1	0.733	23.2	LOS B	30.7	215.2	0.65	0.66	0.65	42.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Church Street												
P1	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
NorthEast: Pennant Hills Road												
P6	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
North: Church Street												
P3	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
P3B	Slip/Bypass	50	53	30.9	LOS D	0.1	0.1	0.90	0.90	184.7	200.0	1.08
West: Albert Street												
P4	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
All Pedestrians		250	263	49.6	LOS E	0.2	0.2	0.94	0.94	203.4	200.0	0.98

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 101 [Existing + Development PM - Church St / Pennant Hills Rd / Albert St (Site Folder: Weekday Existing (2026) + Development Scenario)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Church Street & Pennant Hills Road & Albert Street Intersection
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Church Street															
1	L2	All MCs	57	0.0	57	0.0	0.855	7.1	LOS A	7.0	50.8	0.13	0.16	0.14	48.4
2	T1	All MCs	839	5.1	839	5.1	*0.855	1.9	LOS A	7.0	50.8	0.14	0.17	0.15	56.4
3a	R1	All MCs	462	2.2	462	2.2	0.759	26.7	LOS B	7.0	50.0	0.94	0.81	0.97	43.3
Approach			1358	3.9	1358	3.9	0.855	10.5	LOS A	7.0	50.8	0.41	0.39	0.43	48.5
NorthEast: Pennant Hills Road															
24a	L1	All MCs	36	28.1	36	28.1	0.037	14.3	LOS A	0.8	7.0	0.41	0.62	0.41	49.0
26a	R1	All MCs	566	0.0	566	0.0	*0.855	49.6	LOS D	33.6	235.2	1.00	0.94	1.10	34.9
Approach			602	1.7	602	1.7	0.855	47.5	LOS D	33.6	235.2	0.96	0.93	1.06	35.5
North: Church Street															
7b	L3	All MCs	291	0.0	291	0.0	0.420	6.8	LOS A	0.4	3.2	0.04	0.54	0.04	54.3
8	T1	All MCs	53	58.0	53	58.0	0.420	6.5	LOS A	0.4	9.8	0.15	0.54	0.15	46.0
Approach			343	8.9	343	8.9	0.420	6.8	LOS A	0.4	9.8	0.05	0.54	0.05	53.6
West: Albert Street															
10	L2	All MCs	72	0.0	72	0.0	0.301	34.8	LOS C	8.3	58.0	0.77	0.74	0.77	28.2
10a	L1	All MCs	321	0.7	321	0.7	0.301	33.3	LOS C	8.3	58.6	0.77	0.74	0.77	39.7
Approach			393	0.5	393	0.5	0.301	33.6	LOS C	8.3	58.6	0.77	0.74	0.77	38.2
All Vehicles			2696	3.5	2696	3.5	0.855	21.7	LOS B	33.6	235.2	0.54	0.58	0.57	42.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Church Street												
P1	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
NorthEast: Pennant Hills Road												
P6	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
North: Church Street												
P3	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
P3B	Slip/Bypass	50	53	39.1	LOS D	0.1	0.1	0.90	0.90	192.9	200.0	1.04
West: Albert Street												
P4	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
All Pedestrians		250	263	51.2	LOS E	0.2	0.2	0.94	0.94	205.1	200.0	0.98

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: T:\Synergy\Projects\21\21.564\Modelling\21.564m01v04.sip9

Site: 101 [Existing PM - Church St / Pennant Hills Rd / Albert St (Site Folder: Weekend Existing 2022 Scenario)]

Church Street & Pennant Hills Road & Albert Street Intersection
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Assumed Phasing
Input Phase Sequence: A, B, B1*, B2*, C, D, E*
Output Phase Sequence: A, B, C, D
Reference Phase: Phase A
(* Variable Phase)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Church Street															
1	L2	All MCs	12	0.0	12	0.0	0.198	8.5	LOS A	1.0	7.2	0.11	0.13	0.11	46.5
2	T1	All MCs	172	5.5	172	5.5	0.198	4.1	LOS A	1.0	8.7	0.14	0.14	0.14	53.2
3a	R1	All MCs	1	0.0	1	0.0	* 0.006	60.8	LOS E	0.0	0.2	0.91	0.56	0.91	32.5
Approach			184	5.1	184	5.1	0.198	4.7	LOS A	1.0	8.7	0.14	0.14	0.14	52.4
NorthEast: Pennant Hills Road															
24a	L1	All MCs	67	0.0	67	0.0	0.066	18.1	LOS B	1.8	12.8	0.50	0.65	0.50	47.1
26a	R1	All MCs	303	2.1	303	2.1	* 0.368	28.1	LOS B	11.7	83.3	0.71	0.75	0.71	42.0
Approach			371	1.7	371	1.7	0.368	26.3	LOS B	11.7	83.3	0.67	0.73	0.67	42.8
North: Church Street															
7b	L3	All MCs	43	2.4	43	2.4	0.361	7.1	LOS A	4.5	31.7	0.37	0.39	0.37	51.8
8	T1	All MCs	213	4.5	213	4.5	* 0.361	11.9	LOS A	4.5	31.7	0.38	0.40	0.38	45.5
Approach			256	4.1	256	4.1	0.361	11.1	LOS A	4.5	31.7	0.38	0.40	0.38	47.4
West: Albert Street															
10	L2	All MCs	20	0.0	20	0.0	0.193	26.2	LOS B	5.5	39.5	0.65	0.68	0.65	32.1
10a	L1	All MCs	295	2.5	295	2.5	0.193	24.7	LOS B	5.5	39.6	0.65	0.67	0.65	43.0
Approach			315	2.3	315	2.3	0.193	24.8	LOS B	5.5	39.6	0.65	0.67	0.65	42.5
All Vehicles			1125	3.0	1125	3.0	0.368	18.9	LOS B	11.7	83.3	0.51	0.54	0.51	44.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

MOVEMENT SUMMARY

Site: 101 [Existing + Development PM - Church St / Pennant Hills Rd / Albert St (Site Folder: Weekend Existing + Development Scenario)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Church Street & Pennant Hills Road & Albert Street Intersection
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Church Street															
1	L2	All MCs	12	0.0	12	0.0	0.198	8.5	LOS A	1.0	7.2	0.11	0.13	0.11	46.5
2	T1	All MCs	172	5.5	172	5.5	0.198	4.1	LOS A	1.0	8.7	0.14	0.14	0.14	53.2
3a	R1	All MCs	1	0.0	1	0.0	0.006	60.8	LOS E	0.0	0.2	0.91	0.56	0.91	32.5
Approach			184	5.1	184	5.1	0.198	4.7	LOS A	1.0	8.7	0.14	0.14	0.14	52.4
NorthEast: Pennant Hills Road															
24a	L1	All MCs	67	0.0	67	0.0	0.066	18.1	LOS B	1.8	12.8	0.50	0.65	0.50	47.1
26a	R1	All MCs	320	2.0	320	2.0	0.388	28.4	LOS B	12.5	88.8	0.72	0.76	0.72	41.9
Approach			387	1.6	387	1.6	0.388	26.6	LOS B	12.5	88.8	0.68	0.74	0.68	42.7
North: Church Street															
7b	L3	All MCs	43	2.4	43	2.4	* 0.360	7.1	LOS A	4.5	31.7	0.37	0.39	0.37	51.8
8	T1	All MCs	213	4.5	213	4.5	0.360	11.9	LOS A	4.5	31.7	0.38	0.40	0.38	45.5
Approach			256	4.1	256	4.1	0.360	11.1	LOS A	4.5	31.7	0.38	0.39	0.38	47.4
West: Albert Street															
10	L2	All MCs	20	0.0	20	0.0	0.213	26.5	LOS B	6.2	44.0	0.65	0.68	0.65	32.0
10a	L1	All MCs	328	2.2	328	2.2	0.213	25.0	LOS B	6.2	44.2	0.65	0.68	0.65	42.9
Approach			348	2.1	348	2.1	0.213	25.0	LOS B	6.2	44.2	0.65	0.68	0.65	42.5
All Vehicles			1176	2.9	1176	2.9	0.388	19.3	LOS B	12.5	88.8	0.52	0.55	0.52	44.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Church Street												
P1	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
NorthEast: Pennant Hills Road												
P6	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
North: Church Street												
P3	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
P3B	Slip/Bypass	50	53	25.4	LOS C	0.1	0.1	0.90	0.90	179.2	200.0	1.12
West: Albert Street												
P4	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
All Pedestrians		250	263	48.5	LOS E	0.2	0.2	0.94	0.94	202.3	200.0	0.99

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: T:\Synergy\Projects\21\21.564\Modelling\21.564m01v04.sip9

SITE IMAGE
Landscape Architects
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Introduction and Site
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Masterplan
Ground Floor
Ground Floor Street Frontages
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Level 6 - Detail Plan
Existing Trees
Canopy Cover
Planting Strategy
Deep Soil

Revision	Issue	Date
D	Revsied for Council RFI	23.02.2024
C	Revised for Council RFI	02.02.2024
B	Planning Proposal	11.12.2023
A	Draft	28.11.2023

Prepared By

SITE IMAGE
Landscape Architects

Level 1, 3-5 Baptist Street Redfern 2016 NSW | 02 8332 5600

Introduction and Site

The site is located in North Parramatta within the City of Parramatta Council and includes lot 31 O'Connell Street & 9 Albert street. Some of the key features and landmarks surrounding the site include its proximity to the Parramatta River & Parklands and Parramatta's Heritage Core and the pedestrian connection to the Fleet Street Heritage precinct and stairway located to the north west corner of the site.

The Development sits within the Cumberland Precinct, outlined as one of the four key precincts in the Parramatta North Urban Renewal (PNUR) Planning Framework.

Some of the key summary points, outlined in the PNUR Landscape rezoning report that have driven the landscape design for this planning proposal inlcude:

- Create a unique precinct character with high quality public domain for all to enjoy
- Enhance and preserve habitat areas & quality of vegetation communities
- Preserve / reinterpret existing elements including curtilages, avenues, paths, walls and ornaments
- Improve permeability / and connections to the surrounding parklands and urban fabric

The western curtilage of the site hosts a number of existing trees which create a strong buffer between the high side of the existing rock outcrop and the newly redeveloped Southern Cross Care Nursing Home on the lower site. The proposal looks to retain as many trees as possible and further enhance this western buffer through canopy coverage and ecological screening. Another key opportunity that has been explored in this proposal is the option for a through site link from Harold Street, though the site and down to the lower river level and Fleet Street heritage precinct as indicated below.

31 O'Connell & 9 Albert Street | Planning Proposal
Site Image | 23.02.2024

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Landscape Principles

Connectivity

Create better thought site permeability through a functional, legible ground plane

Activation

Enliven the urban fabric and draw people though the site

Ecology

Celebrate native flora and encourage habitat

Functionality

Create pleasant usable spaces to serve residents and the community

Masterplan

The landscape 31 O'Connell & 9 Albert Street seeks to provide an attractive, green setting with accessible open spaces closely interwoven with the proposed built form.

A variety of common open spaces will provide connectivity though the site and opportunity for passive and active recreation for residents.

The spaces will provide an attractive outlook for apartments surrounding as well as a high level of amenity. Features within the spaces include BBQs, dining, seating, open lawn areas, play spaces and exercise equipment. Pockets of deep soil within the podiums will be utilised for canopy tree planting ensuring shaded areas to the common open space and a green outlook for adjacent apartments.

Green spaces to upper roof and terraces offer further amenity for residents to retreat and socialise. These may include BBQs, dining facilities, and seating spaces with an attractive outlook and solar access.

Street tree planting to O'Connell and Albert Streets contribute to the local public domain, providing a pleasant pedestrian experience.

The planting palette will showcase locally endemic species supplemented by native species and some exotic planting. Species will be chosen to support legibility throughout the site. Materiality shall compliment the architectural proposal.

Ground Floor

- (A) Boundary Planting to Western Setback
- (B) New Street Tree Planting to Albert Street
- (C) Embellishment of Heritage Pedestrian Link to Fleet Street
- (D) Retention of Existing Trees
- (E) Improvements to Streetscape
- (F) Retail spill-out zone along O'Connell Street
- (G) Through Site link with proposed future connection to Fleet Street
- (H) Large Open Communal Lawn
- (I) BBQ and dining for residents
- (J) Childcare Outdoor Area

31 O'Connell & 9 Albert Street | Planning Proposal
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Ground Floor
Street Frontages/Amenity Area

The Public Domain interface works with the proposed design for the ground floor to enhance the pedestrian corridors surrounding the site. The street frontage also provides connections from several points on O'Connell Street to an amenity node, providing pedestrians and residents with a multi-purpose open turf area and BBQ dining opportunities. The public domain paving interfaces with the frontage paving to differentiate between the streetscape and the publicly accessible areas of the development, with screening planting providing privacy to the residents.

A Public Domain Paving/Feature Paving interface
B Stair Access to Amenity Node
C Open Turf Space
D BBQ Area
E Screening Planting

31 O'Connell & 9 Albert Street | Planning Proposal
Site Image | 23.02.2024

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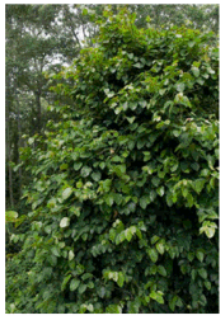
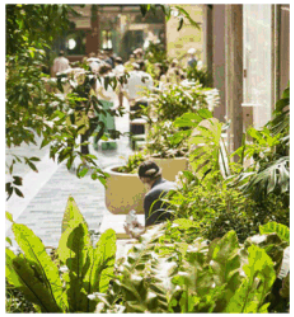
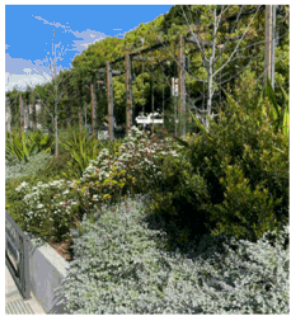
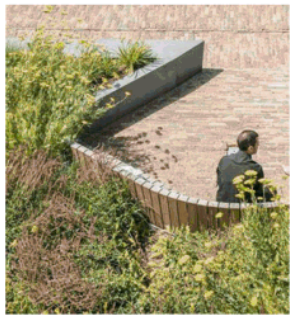
Ground Floor
Boundary Planting

A generous setback to the east and southern boundaries of the site provides and opportunity for a continuous, layered vegetative treatment.
Planting will consist of locally indigenous shrub grass groundcover and tree species utilising the deep soil available in this location. In addition there are also multiple existing trees to be retained in this location along with key cultural trees (*Phoenix caneriensis*) to be transplanted and relocated to the Western setback.



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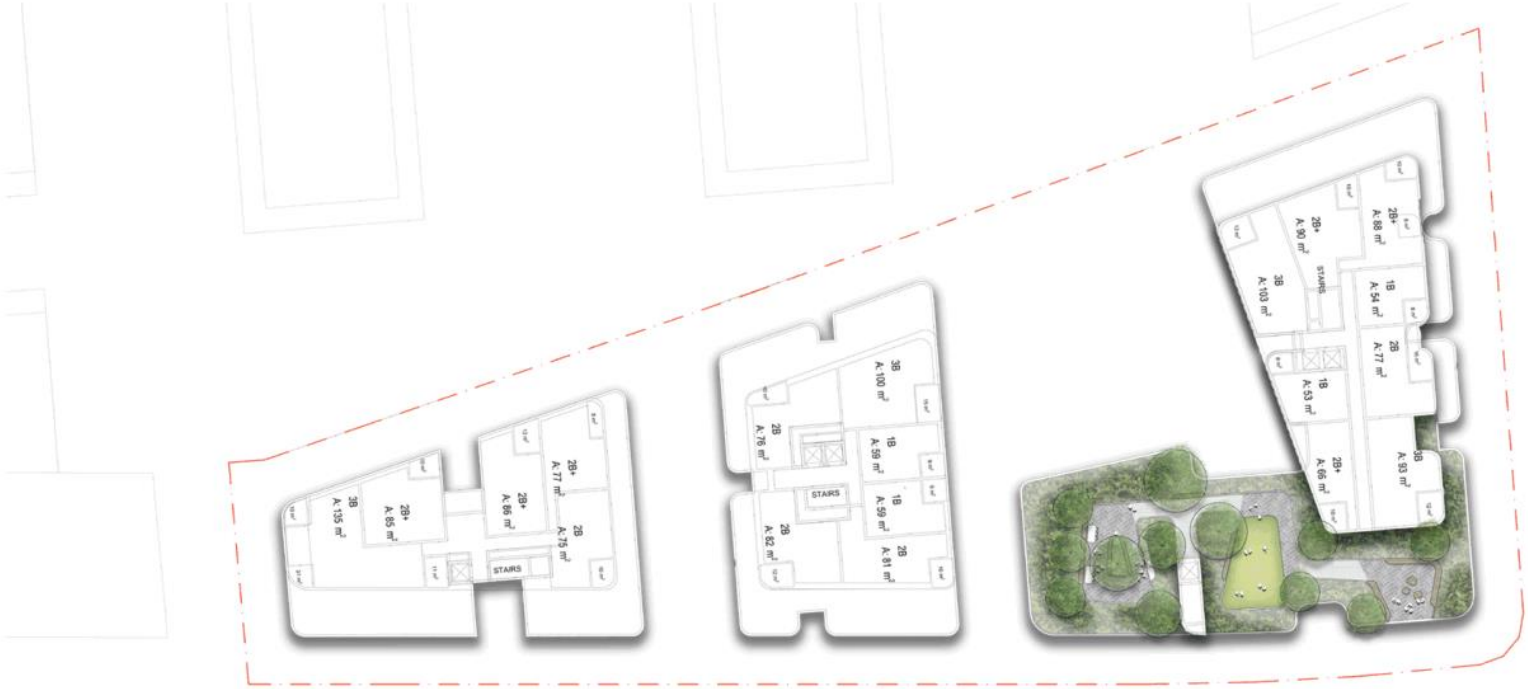
Level 6



31 O'Connell & 9 Albert Street | Planning Proposal
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Level 6

The Level 6 Rooftop offers dining, lounge and passive amenity spaces for residents, with a sizeable open turf space for active use. The dining area utilises canopy trees for natural shade amenity, and is sheltered away from the open turf area to provide some privacy for residents. The turf area provides some active amenity for children to run around, with recessed seating sheltered by shade trees for those looking for a place to rest nearby.

(A) BBQ Area
(B) Passive seating zone
(C) Open Turf Space
(D) Dining Seating

31 O'Connell & 9 Albert Street | Planning Proposal
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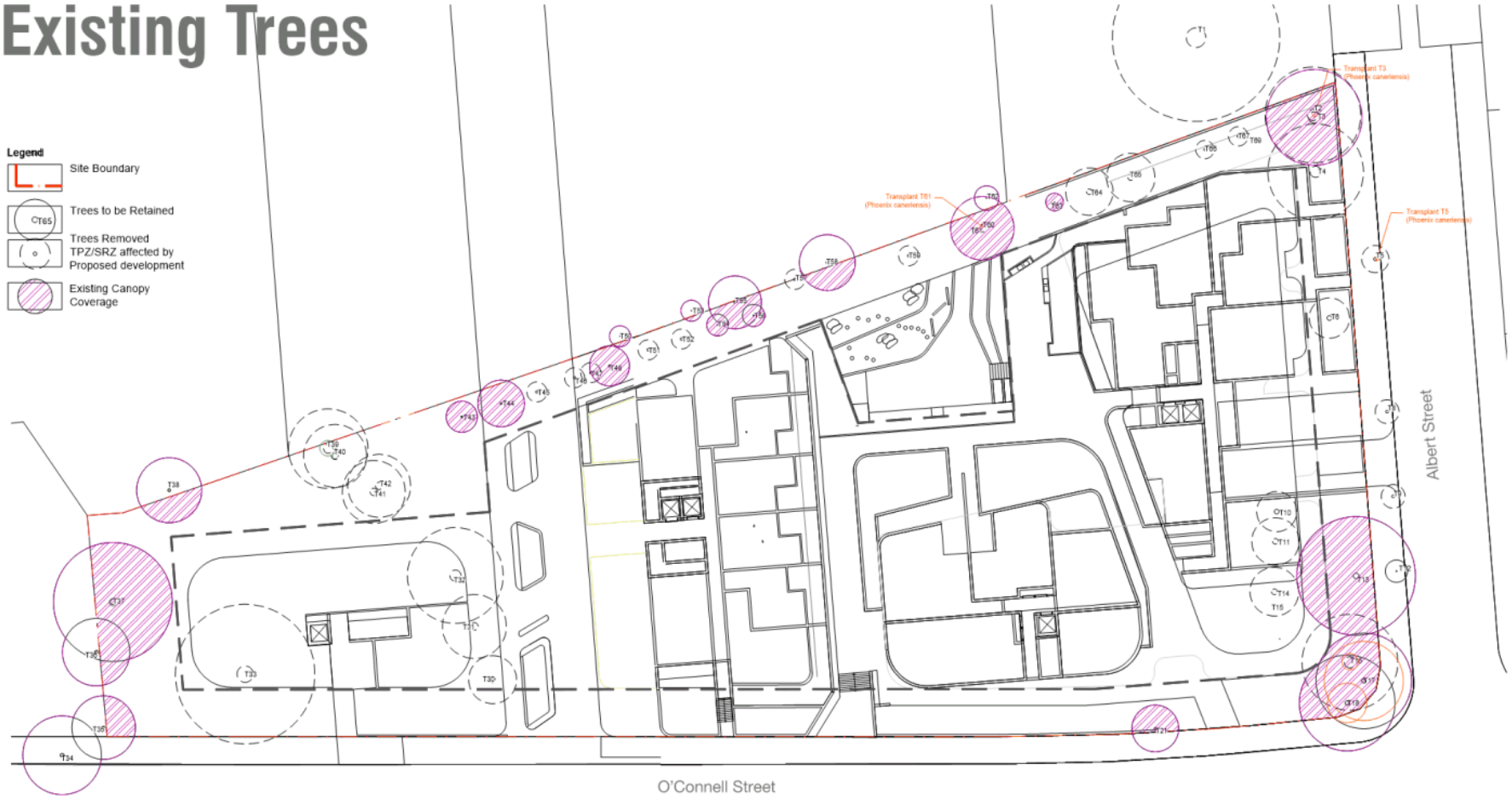
Existing Trees



The Tree Retention and removal plan has been developed with respect to the Arboricultural Impact Assessment by McArdle Arboricultural Consultancy, 28th November, 2022. Of the 65 Trees assessed on site 22 are to be retained and three of the Date Palms are proposed to be transplanted into the western setback. As some of the high retention value trees require removal a stringent tree replacement strategy has been developed to mitigate the loss of canopy and ensure future canopy targets are met.

Existing canopy cover on site: 614 m2
6.8%

Trees to be Retained 3 (transplant), 5 (transplant), 12, 13, 17, 18, 21, 34, 35, 36, 37, 38, 42b, 43, 44, 48, 50, 53, 54, 55, 56, 58, 61 (transplant), 62 and 63.

Trees to be Removed including exempt trees: 1, 2, 2a, 4, 6, 8, 9, 10, 11, 30, 31, 32, 33, 41, 42, 45, 45a (x4), 46, 47, 51, 52, 57, 59, 64, 65, 66, 67, 69, 14, 15, 16, 32a, 32b, 39, 40, 60a, 60b and 61a.

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Proposed Canopy Cover

O'Connell Street

The Greener Places Strategic Framework by the NSW Government Architect outlines the canopy targets for urban centres over the coming years. For a mixed use development such as this one, Targets are Greater than 25 per cent tree canopy cover in urban residential (medium- to high-density) and light commercial areas. The calculation is based on the assumption that the proposed trees will reach 70% maturity in 10-15 years.

Existing canopy cover on site: 614 m2
6.8%

Proposed Canopy Target @ 10-15 Years Maturity - 27%

Site Area: 8965m2

Ground Floor Canopy Cover: 1918 m2

Level 6 Canopy Cover: 324 m2

Total: 2242 m2 (25.0%)

Combined Canopy Coverage (Existing & Proposed): 31.8%

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Planting Strategy

Boundary Planting

- Native species
- Variety of shrub grass groundcover and canopy trees

Through Site Link

- Variety of colour and texture
- Feature tree species to east west axis

Streetfront

- Street tree planting
- Shrub and groundcover planting to retail frontages

Ground Floor Amenity

- Variety of shrub grass groundcover and tree planting for amenity and visual interest across podium
- Shade tolerant plant species

Level 6 Rooftops

- Wind tolerant species to contribute to amenity of rooftop spaces

Planting Strategy

Boundary Planting

Botanical Name	Common Name	Mature Size
Boundary Planting		
Trees		
Angophora floribunda	Rough Barked Apple	30 x 8
Acacia parramattensis	Sydney Green Wattle	15 x 5
Backhousia myrtifolia	Grey Myrtle	3 x 4
Ceratopetalum apetulum	NSW Christmas Bush	20 x 5
Casuarina glauca	Swamp Oak	15 x 6
Eucalyptus crebra	Narrow Leaf Iron Bark	30 x 8
Eucalyptus fibrosa	Red Ironbark	35 x 10
Eucalyptus paniculata	Grey Ironbark	25 x 8
Eucalyptus resinifera	Red Mahogany	25 x 8
Eucalyptus saligna	Sydney Blue Gum	20 x 10
Eucalyptus sparsifolia	Narrow-leaved Stringybark	20 x 8
Shrubs and Groundcovers		
Acacia longifolia	Sydney Golden Wattle	8 x 4
Acacia parramattensis	Parramatta Wattle	15 x 5
Breynia oblongifolia	Coffee Bush	3 x 2
Bursaria spinosa	Sweet Bursaria	3 x 4
Callistemon salignus	Willow Bottlebrush	7 x 4
Dichondra repens	Kidney Grass	.1 x 1
Dodonaea triquetra	Common Hop Bush	3 x 3
Hakea dactgloides	Broad-leaved Hakea	2.5 x 3
Kunzea ambigua	White Kunzea	1 x 1
Leptospermum trinervium	Flaky-barked Tea-tree	2 x 1
Lomandra filiformis	Wattle Mat Rush	1 x 1
Lomandra longifolia	Spiny-Head Mat Rush	.5 x .2
Leptospermum polygalifolium	Lemon Scented Tea Tree	4 x 3
Ozothamnus diosmifolius	Rice Flower	1.5 x 1.2
Pratia purpurascens	Whiteroot	.1 x 1
Themeda australis	Kangaroo Grass	.4 x .4
Wahlenbergia gracili	Sprawling Bluebell	.2 x1

Streetfront

Botanical Name	Common Name	Mature Size
Streetfront		
Street tree species in consultation with council		
Shrubs		
Acmena smithii 'Sublime'		5 x 2
Callistemon 'Little John'	Dwarf Bottlebrush	1m
Doryanthes excelsa	Gymea Lily	4 x 3
Loropetalum 'Plum Gorgeous'	Fringe Flower	.3 x 1.5
Syzygium Tiny Trev	Dwarf Lilly Pilly	0.6 x 0.6
Raphiolepis indica 'Oriental Pearl'		1 x 1
Westringia fruiticosa	Coastal Rosemary	1 x 1
Westringia fruiticosa 'Mundi'	Zena Coastal Rosemary	.4 x .5
Grasses and Groundcovers		
Agapanthus africanus	African Lily	0.9 x 0.6
Convolvulus mauritanicus	Ground Morning Glory	0.3 x 1
Carpobrotus glaucescens	Pigface	.2 x .1
Dianella caerulea 'Little Jess'	Blue Flax Lily	0.5 x 0.5
Gazania tomentosa	Silver Leaf Gazania	0.2 x 0.6
Hardenbergia violacea	Native Sarsoparilla	climbing x spreading
Hibbertia scandens	Snake Vine	0.2 x 2
Lomandra longifolia	Mat Rush	0.7 x 1
Lomandra multiflora	Lomandra multiflora	.4 x .4
Lomandra 'Tanika'	Fine Leaf Dwarf Lomandra	0.5 x 0.65
Myoporum parvifolium	Creeping boobialla	0.6 x 1.5

31 O'Connell & 9 Albert Street | Planning Proposal
Site Image | 23.02.2024

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Planting Strategy

Through Site Link

Botanical Name	Common Name	Mature Size
Through Site Link		
Trees		
Corymbia ficifolia Mini Red	Flowering Gum	2.5 x 2
Elaeocarpus reticulatus	Blueberry Ash	3 x 10
Pyrus ussuriensis	Manchurian Pear	10 x 6
Pyrus 'Capital'	Pear	10 x 6
Tristaniopsis laurina	Water Gum	15 x 6
Fraxinus oxycarpa 'Raywoodii'	Claret Ash	12 x 7
Waterhousia floribunda	Weeping Lilly Pilly	15 x 8
Shrubs		
Acmena smithii 'Sublime'		5 x 2
Alcantarea imperialis 'Rubra'	Imperial Bromeliad	1 x 1
Beschorneria yuccoides	Mexican lily	.6 x .6
Crassula Bluebird		.6 x .6
Callistemon 'Little John'	Dwarf Bottlebrush	1m
Doryanthes excelsa	Gymea Lily	4 x 3
Dodonaea triquetra	Hop Bush	3 x 2
Loropetalum 'Plum Gorgeous'	Fringe Flower	.3 x 1.5
Phormium cookianum	Mountain Flax	1 x 1
Photinia glabra 'Rubens'	Small Leaf Photinia	4.5 x 2
Phormium tenax 'Atropurpureum'	Red NZ Flax	2 x 1.5
Pittosporum 'Miss Muffet'	Dwarf Pittosporum	1 x 1.5
Plectranthus argentatus 'Silver Shield'		1 x 1
Syzygium Tiny Trev	Dwarf Lilly Pilly	0.6 x 0.6
Raphiolepis indica 'Oriental Pearl'		1 x 1
Viburnum odoratissimum	Sweet Viburnum	3 x 2
Westringia fruiticosa	Coastal Rosemary	1 x 1
Grasses and Groundcovers		
Agapanthus africanus	African Lily	0.9 x 0.6
Convolvulus mauritanicus	Ground Morning Glory	0.3 x 1
Carpobrotus glaucescens	Pigface	.2 x .1
Dianella caerulea 'Little Jess'	Blue Flax Lily	0.5 x 0.5
Dichondra 'Silver Falls''		.1 x 1
Gazania tomentosa	Silver Leaf Gazania	0.2 x 0.6
Hardenbergia violacea	Native Sarsoparilla	climbing x spreading
Hibbertia scandens	Snake Vine	0.2 x 2
Juniperus conferta	Shore Juniper	.3 x 4
Lomandra longifolia	Mat Rush	0.7 x 1
Lomandra multiflora	Lomandra multiflora	.4 x .4
Lomandra 'Tanika'	Fine Leaf Dwarf Lomandra	0.5 x 0.65
Myoporum parvifolium	Creeping boobialla	0.6 x 1.5
Russelia equisetiformis		.5 x 1
Trachelospermum jasminoides	Star Jasmine	0.6 x spreading
Viola hederacea	Native Violet	0.1 x 3

31 O'Connell & 9 Albert Street | Planning Proposal
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Planting Strategy

Ground Floor Amenity Planting

Botanical Name	Common Name	Mature Size
Trees		
Corymbia ficifolia Mini Red	Flowering Gum	2.5 x 2
Elaeocarpus reticulatus	Blueberry Ash	3 x 10
Eucalyptus moluccana	Grey Box	9 x 4
Melaleuca linariifolia	Snow in Summer	10 x 5
Pyrus ussuriensis	Manchurian Pear	10 x 6
Pyrus 'Capital'	Pear	10 x 6
Tristaniopsis laurina	Water Gum	15 x 6
Fraxinus oxycarpa 'Raywoodii'	Claret Ash	12 x 7
Waterhousia floribunda	Weeping Lilly Pilly	15 x 8
Shrubs		
Alcantarea imperialis 'Rubra'	Imperial Bromeliad	1 x 1
Beschorneria yuccoides	Mexican lily	.6 x .6
Blechnum 'Silver Lady''	Silver Lady Fern	1.2 x 1
Doryanthes excelsa	Gymea Lily	4 x 1.5
Dodonaea triquetra	Large Leaf Hop Bush	3 x 3
Alcantarea imperialis 'Rubra'	Imperial Bromeliad	1 x 1
Beschorneria yuccoides	Mexican lily	.6 x .6
Crassula Bluebird		.6 x .6
Lavandula dentata	Lavender	.6 x .6
Persoonia linearis	Narrow-leaf Geebung	3 x 2
Pittosporum 'Miss Muffet'	Dwarf pittosporum	1 x 1
Raphiolepis indica 'Oriental Pearl'		1 x 1
Russelia equisetiformis	Fire Cracker Plant	1 x 1
Viburnum odoratissum	Sweet Viburnum	3 x 2.5
Westringia fruiticosa Zena	Zena Coastal Rosemary	1 x 1
Groundcovers		
Clematis aristata	Australian Clematis	6 x 2
Carpobrotus glaucescens	Pigface	0.2 x 1
Chlorophytum comosum	Spider Plant	0.6 x 0.6
Cissus antatrica	Kangaroo Vine	.1 x 1
Dichondra 'Silver Falls'		0.1 x Spreading
Dianella caerulea	Flax Lily	0.5 x 1
Grevillea Bronze rambler	Bronze rambler grevillea	1 x 1
Hibbertia scandens	Snake Vine	0.2 x 2
Imperata cylindrica	Cogon grass	1.5 x 0.6
Lomandra longifolia	Spiny head mat rush	0.7 x 1m
Juncus usiatus	Tussock Rush	1m h
Myoporum parvifolium	Creeping boobialla	0.2 x 1.5
Poa labillarderi 'Eskdale'	Poa labillarderi	0.8 x 0.4
Pandorea pandorana	Wonga Wonga Vine	2 x 1
Themeda australis	Kangaroo Grass	1 x 0.5
Hibbertia scandens	Snake Vine	0.2 x 2
Trachelospermum jasminoides	Star Jasmine	0.3 x 1.5
Viola hederacea	Native Violet	0.2 x 0.5

Level 6

Botanical Name	Common Name	Mature Size
Trees		
Corymbia ficifolia Mini Red	Flowering Gum	2.5 x 2
Pyrus 'Capital'	Pear	10 x 6
Tristaniopsis laurina	Water Gum	15 x 6
Shrubs		
Beschorneria yuccoides	Mexican lily	.6 x .6
Acmena smithii 'Sublime'	Lily Pilly	.5 x 2
Doryanthes excelsa	Gymea Lily	4 x 1.5
Dodonaea triquetra	Large Leaf Hop Bush	3 x 3
Crassula Bluebird		.6 x .6
Leucopogon juniperinus	Prickly beard-heath	1 x 1
Raphiolepis indica 'Oriental Pearl'		1 x 1
Russelia equisetiformis	Fire Cracker Plant	1 x 1
Westringia fruiticosa Zena	Zena Coastal Rosemary	1 x 1
Groundcovers		
Carpobrotus glaucescens	Pigface	0.2 x 1
Dianella caerulea	Flax Lily	0.5 x 1
Grevillea Bronze rambler	Bronze rambler grevillea	1 x 1
Hibbertia scandens	Snake Vine	0.2 x 2
Lomandra longifolia	Spiny head mat rush	0.7 x 1m
Juncus usiatus	Tussock Rush	1m h
Myoporum parvifolium	Creeping boobialla	0.2 x 1.5
Pennisetum alpecuroides 'Nafray'	Nafray Swamp Foxtail	0.6 x 0.6
Hibbertia scandens	Snake Vine	0.2 x 2
Trachelospermum jasminoides	Star Jasmine	0.3 x 1.5
Viola hederacea	Native Violet	0.2 x 0.5

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17

Deep Soil

Site Area	8910	sqm	
Deep Soil Planted	**2003**	**sqm**	**22%**
Planted Under Awning	485	sqm	5%
Deep Soil Hardstand	325	sqm	4%
Deep Soil Awning or Building Over	350	sqm	4%
Total Potential Deep Soil	3163	sqm	35%

Deep Soil Zone Definition

A specified area of the development site, not covered by an impervious surface, that allows water on the site to infiltrate naturally to the groundwater and allows for the future provision of mature vegetation

Source: Glossary Parramatta Development Control Plan 2011

31 O'Connell & 9 Albert Street | Planning Proposal
Site Image | 23.02.2024

18

REPORT: **Arboricultural Impact Assessment**

REPORT COMMISSIONED FOR:

Andrew Doueihi, Development Manager
Peterose Pty Ltd

PP/2022/4283

Lot 1, DP 1143431 & Lot 1, DP 998240
9 Albert Street & 31 O'Connell Street
North Parramatta NSW 2151

22nd of February, 2024

PREPARED BY:

Jim McArdle
Consulting Arborist
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Document Tracking

Name	Contribution	Date		
Hephzibah Ryan & Michelle King Environmental Document Writer	Report Writer	31/10/2022 (V1) 18/11/2022 (V2) 28/11/2022 (V4)	15/12/2022 (V5) 10/10/2023 (V6) 26/10/2023 (V8)	19/02/2024 (V10) 22/02/2024 (V12)
Jim McArdle AQF Level 5 Arborist	Site Assessor Editor	18/11/2022 (V3) 10/10/2023 (V7) 30/10/2023 (V9)	20/02/2024 (V11)	

1. EXECUTIVE SUMMARY

1.1 The client commissioned an Arboricultural Impact Assessment to evaluate the potential impacts on trees by a proposed development and, if viable, to make recommendations that reduce the impacts on trees at 9 Albert Street and 31 O'Connell Street, North Parramatta NSW 2151.

1.2 The proposed development (**PP/2022/4283**) involves the construction of an apartment complex with basement carparking and ground floor retail and childcare spaces.

1.3 The assessment was conducted on the 27th of October and the 21st of November, 2022 by an AQF Level 5 arborist. The trees were reassessed on the 3rd of October, 2023.

1.4 Approximately sixty-nine (69) trees/tree groups on site and in the adjacent surrounding area were assessed and are summarised as follows:

Table 1: *Retention Values.*

High (4 trees)	Moderate (13 trees)	Low-Moderate (18 trees/tree groups)	Low (17 trees/tree groups)	Very Low (10 trees)
1, 2, 34, 37.	4, 9, 11, 13, 17, 21, 31, 33, 35, 36, 41, 58, 61.	2a, 6, 8, 10, 12, 18, 42, 42b, 44, 45, 46, 48, 55, 61a, 64, 65, 66, 69.	3, 5, 38, 39, 40, 43, 45a, 47, 50, 51, 53, 54, 56, 59, 62, 63, 67.	4, 15, 16, 30, 32a, 32b, 52, 57, 60a, 60b.

Table 2: *Tree Works.*

Retain (16 trees)	Prune (1 tree)	Remove (46 trees)
1, 2, 2a, 3, 5, 12, 34, 35, 36, 37, 43, 50, 53, 58, 61, 62.	37.	4, 6, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 21, 30, 31, 32a, 32b, 33, 38, 39, 40, 41, 42, 42b, 44, 45, 45a, 46, 47, 48, 51, 52, 54, 55, 56, 57, 59, 60a, 60b, 61a, 63, 64, 65, 66, 67, 69.

Table 3: *Tree Management Plan.*

Tree Management Measures	Tree No.
Mulch Ground Cover Protection	2, 2a, 36, 37, 43, 61.
Tree Protection Fencing	1, 2, 2a, 3, 35, 36, 37, 43, 50, 53, 58, 61, 62.
Tree Trunk Protection	5, 12, 34.
Branch Mapping Report	37.

1.5 **Retain** sixteen (16) trees numbered 1, 2, 2a, 3, 5, 12, 34, 35, 36, 37, 43, 50, 53, 58, 61 and 62.

1.6 **Prune** one (1) tree numbered 37 to provide clearance around the proposed apartment building. A branch mapping report is required to assess the extent of clearance pruning required for this tree.

1.7 **Remove** forty-six (46) trees/tree groups numbered 4, 6, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 21, 30, 31, 32a, 32b, 33, 38, 39, 40, 41, 42, 42b, 44, 45, 45a, 46, 47, 48, 51, 52, 54, 55, 56, 57, 59, 60a, 60b, 61a, 63, 64, 65, 66, 67 and 69. Of these trees, twenty-seven (27) trees numbered 6, 10, 11, 14, 15, 16, 30, 32a, 32b, 38, 39, 40, 42, 47, 51, 52, 54, 56, 57, 59, 60a, 60b, 61a, 63, 66, 67 and 69 are exempt from preservation under Parramatta DCP 2023[1] and are not worthy of special measures to ensure their preservation.

[1] *https://www.cityofparramatta.nsw.gov.au/document/40611*

2. INTRODUCTION

2.1 AIMS

The aim of the report is to:

2.1.1 To assess the trees' health and retention value and to evaluate the potential impacts on trees by the proposed development.

2.1.2 To provide options, if viable, to reduce potential impacts on trees and make recommendations for tree management and protection during development.

2.2 SCOPE

2.2.1 Andrew Doueihi of Peterose Pty Ltd commissioned an Arboricultural Impact Assessment for the site at 9 Albert Street and 31 O'Connell Street, North Parramatta NSW 2151.

2.2.2 The assessment was conducted on the 27th of October and the 21st of November, 2022 by Jim McArdle B.Ed. Sci (ACU), Dip. Arb AQF L5 (Ryde), Tree Risk Assessment Qualified (TRA), Quantified Tree Risk Assessment (QTRA) & Tree Contractors Association of Australia (TCAA) Vice President. The trees were reassessed on the 3rd of October, 2023.

2.2.3 Tree management measures are regulated by Parramatta Development Control Plan (DCP) 2023 and Parramatta Local Environmental Plan (LEP) 2023.

2.2.4 Approximately sixty-nine (69) trees/tree groups on site and in the adjacent surrounding area were assessed.

2.2.5 The inspection does not include below ground root excavation, and no expert laboratory analyses – including internal diagnostics, inaccessible trunk and aerial inspections – were conducted. No pathology tests or soil analyses were conducted. Sketches, diagrams, graphs, and photographs in this report, being intended as visual aids, are not necessarily to scale.

2.2.6 The client has provided documentation relating to the trees prepared by Angela Maroney of Urban & Rural Design Landscape Architects.

2.3 METHODOLOGY

2.3.1 The inspection was primarily conducted using ground-based collection of data to identify visible signs of tree health, structure and potential hazards. Collection data methods may include the use of a mallet for sound testing, the use of a trowel to test for soil compaction, and the use of a screwdriver to probe cavities for pathogens, pests and disease. The assessments do not involve laboratory analysis. Methods may include the following:

Visual Tree Assessment (VTA) (Mattheck and Breloer 1994), a method for assessing biological and lower-level mechanical functions and signs of decay, damage or defects (Appendix A).

Tree AZ Categories (Barrell 2010) classifies the importance of trees on development sites (Appendix B).

- **Category A** – suitable for retention.
- **Category Z** – not worthy of constraint.

Tree Useful Life Expectancy (TULE) (Barrell 2014) determines the time a tree can be expected to be usefully retained in normal circumstances (Appendix C).

- **Long** > 40 years.
- **Medium** 15 – 40 years.
- **Short** 5 – 15 years.
- **No retention potential** 0 – 5 years.

Landscape Significance Rating (Morton 1996), (Appendix D).

- **Significant** – based on heritage or ecological value.
- **Very High** – based on adjacent area surrounding the site.
- **High** – neighbourhood status but may have some conditions or health issues.
- **Moderate** – good and worthy of preservation, may have minor health issues.
- **Low** – worthy of preservation, may have major conditions or health issues.
- **Very Low** – retain if possible.
- **Insignificant** – exempt from retention.

Retention Value Rating (Morton 2011), determined by considering both TULE and the Landscape Significance (Appendix E).

- **High** retention value trees are a priority for retention.
- **Medium** retention value trees are retained where possible.
- **Low** retention value trees are generally not a constraint to development.
- **Very Low** retention value trees may have potential hazards.

Planting Specifications from NATSPEC (Clark 2003) and Australian Standard® AS 2303-2018 – Tree Stock for Landscape Use (Appendix F).

2.3.2 **Tree Contractors** must have a minimum AQF Level 3 Certificate in Arboriculture and work in accordance with Australian Standard® AS 4373-2007 – Pruning of Amenity Trees, the Work Health & Safety (WHS) Act 2011 and the WHS Regulations 2017, the SafeWork NSW – Guide to Managing Risks of Tree Trimming and Removal Work 2016, and the Code of Practice for The Amenity Tree Industry 1998. Work near powerlines should be carried out in accordance with the Code of Practice for Work Near Overhead Power Lines.

3. RESULTS

3.1 THE SITE

3.1.1 The site is 9 Albert Street and 31 O'Connell Street, North Parramatta NSW 2151.

3.1.2 This landscape slopes to the south-west, and the soils[2] are classified generally as fine sandy loam.

Figure 1: *Aerial site map of 9 Albert Street and 31 O'Connell Street, Parramatta NSW 2150 (Nearmap 2024). The site perimeter is outlined in yellow.*

[2] *Espade.environment.nsw.gov.au*

3.2 LEGISLATION AND SIGNIFICANCE IN THE ENVIRONMENT

Trees are subject to the following commonwealth and State Legislation:

3.2.1 NSW and Commonwealth Legislation regulates the **Biosecurity Act 2015** (diseases and pests) and the **Environmental Protection & Biodiversity Conservation Act 1999 (EPBC Act)**, which manages nationally endangered ecological communities (EEC) and national heritage items. The EPBC Act delegates to the **NSW Biodiversity Conservation Act 2016 (BC Act)**[3] and allows state and local authorities to manage ecological and heritage matters of significance. The BC Act repealed (but still has some transitional arrangements) the NSW Threatened Species Conservation Act 1995. The BC Act may require a Species Impact Statement and Biodiversity Banking and Offset Scheme agreements determined by the Biodiversity Assessment Method (BAM).

3.2.2 NSW State Legislation[3] is regulated under the **NSW Environmental Planning and Assessment Act 1979 (EP&A Act),** which manages significant development and infrastructure in NSW. The EP&A Act utilises **Environmental Planning Instruments (EPI)**[4]. These instruments include **State Environment Planning Policies (SEPP)** that deal with matters of state or regional environmental planning significance and **Local Environmental Plans (LEP)** that provide local councils a framework for land usage. **SEPP (Vegetation in Non-Rural Areas) 2017** applies to this local government area (LGA) and prohibits clearing vegetation without council consent.

3.2.3 NSW **Rural Fire Act 1997**[5] regulates a **10/50 Vegetation Clearing Code**, which may allow a designated area to clear trees within 10 metres of a home and clear underlying vegetation such as shrubs (but not trees), within 50 metres of a home to reduce risk from bushfires. The 10/50 Vegetation Clearing Code does not apply to this site.

3.2.4 An analysis of state and local legislation, development controls and planning instruments concludes the following:

- **Tree management measures**[6] are regulated by Parramatta DCP 2023 and Parramatta LEP 2023.
- **Acid Sulfate Soils:** Class 5.
- **Key Sites:** Parramatta North Urban Renewal Area.
- **Land Zoning:** B4: Mixed Use.
- **Local Aboriginal Land Council:** Deerubbin.

[3] *https:// https://www.environment.nsw.gov.au*
[4] *https://www.planningportal.nsw.gov.au/*
[5] *https://www.rfs.nsw.gov.au/*
[6] *https://www.cityofparramatta.nsw.gov.au/*

3.3 LOCAL PLANNING AND ZONING CONTROLS

Site Address: 9 Albert Street & 31 O'Connell Street, Parramatta NSW 2150.

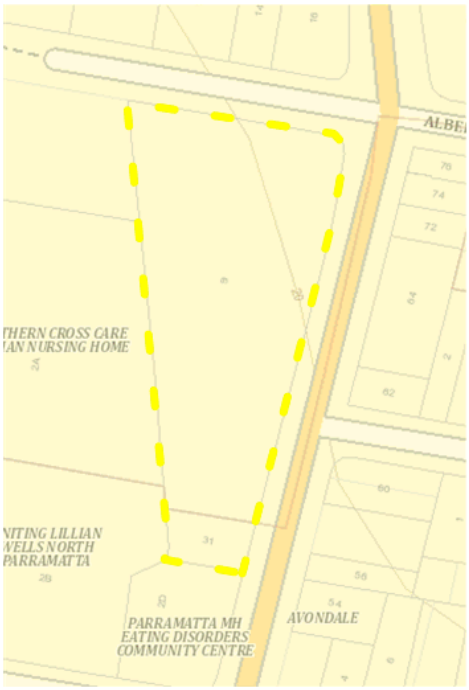


Figure 2: *Acid Sulfate Soils.*
Class 5 (yellow).

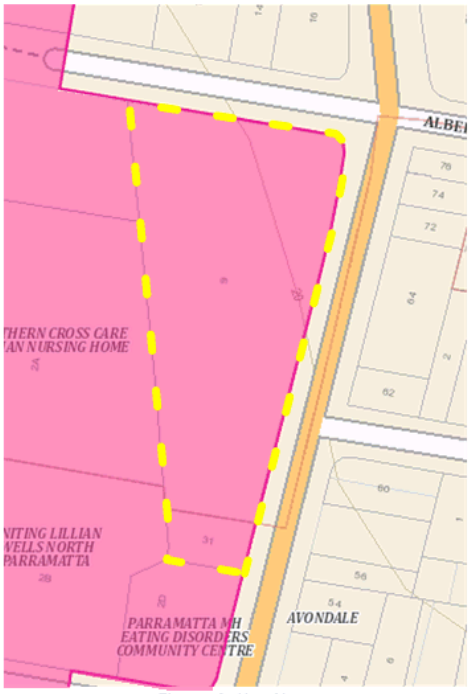


Figure 3: *Key Sites.*
Parramatta North Urban Renewal Area (pink).

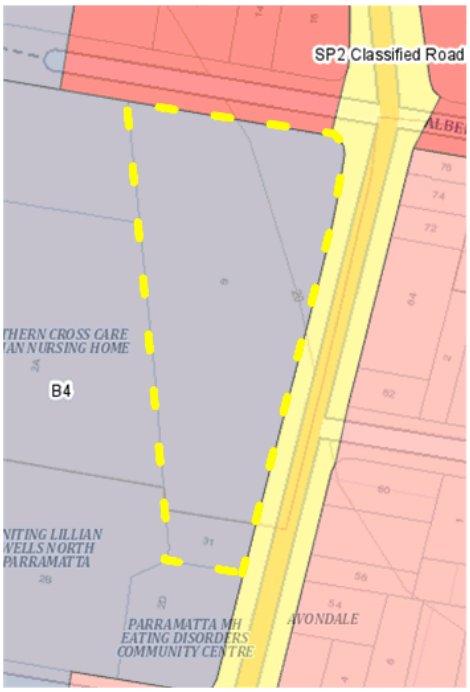


Figure 4: *Land Zoning.*
B4: Mixed Use (purple).

3.4 TREE SCHEDULE

Table 4: *Tree Schedule – Health and Structural Condition of Trees.*

(*DBH – Diameter Breast Height, *DRC – Diameter Root Collar, *TPZ – Tree Protection Zone, *SRZ – Structural Root Zone, *TULE – Tree Useful Life Expectancy).

Tree No.	Location	Botanical Name Common Name	Crown (m)	Height (m)	DBH* DRC* (cm)	TPZ* SRZ* (m)	Tree Health & Condition	TULE* A-Z	Retention Value	Control Measures
1	2b Fleet Street.	*Ficus spp.* Ficus	20	15	100 150	12.0 3.9	Mature, good condition.	2d A1	High	**Retain** and **protect.**
2	North-western corner.	*Eucalyptus microcorys* Tallowwood	18	26	75 80	9.0 3.0	Semi-mature, good condition but poor development.	3a A1	High	**Retain** and **protect.**
2a	North-western corner.	*Ficus spp.* Ficus	6	10	8/24 25	3.0 1.9	Immature, good condition but poor development, with an extensive lean to the east.	2d A2	Low-Moderate	**Retain** and **protect.**
3	North-western corner.	*Phoenix canariensis* Canary Island Date Palm	< 2	< 2	17 30	2.0# 2.0	Immature, good condition.	2a A1	Low	**Retain** and **protect.**
4	North-western corner.	*Eucalyptus piperita* Sydney Peppermint	14	25	40 45	4.8 2.4	Semi-mature, good condition but poor development.	2d Z10	Moderate	**Remove** and **replenish.**
5	Council street tree.	*Fraxinus spp.* Ash	5	5	10/15/15 20	2.8 1.7	Immature, good condition but poor development, heavily pruned.	2a A1	Low	**Retain** and **protect.**
6	Northern boundary.	*Liquidambar styraciflua* American Sweet Gum	5	10	22 23	2.6 1.8	Immature, dead/dying.	4a Z4	Low-Moderate	**Remove** (Exempt, dead/dying).
7	**Removed prior to this report.**									
8	Council street tree.	*Fraxinus spp.* Ash	NS 4 EW 1	4	30 32	3.6 2.1	Immature, good condition but poor development.	2a Z10	Low-Moderate	**Remove** and **replenish.**
9	Council street tree.	*Fraxinus spp.* Ash	NS 5 EW 6	8	20/20 28	3.4 1.9	Immature, good condition but poor development.	2a Z10	Moderate	**Remove** and **replenish.**
10	Northern boundary.	*Grevillea robusta* Silky Oak	8	8	34 40	4.1 2.3	Semi-mature, dead/dying, with damaged roots.	4a Z4	Low-Moderate	**Remove** (Exempt, dead/dying).
11	Northern boundary.	*Fraxinus angustifolia* Claret Ash	14	10	16/49 47	6.2 2.4	Semi-mature, dead/dying,	4a Z4	Moderate	**Remove** (Exempt, dead/dying).
12	Council street tree.	*Fraxinus species* Ash	NS 4 EW 3	4	15/15 20	2.5 1.7	Immature, good condition but poor development.	2a A1	Low-Moderate	**Retain** and **protect.**
13	Northern boundary.	*Eucalyptus cinerea* Argyle Apple	12	12	18/50 60	6.4 2.7	Semi-mature, good condition.	2a Z10	Moderate	**Remove** and **replenish.**
14	Northern boundary.	*Species unknown* (stag)	4	6	70 74	8.4 2.9	Dead, with no hollows.	4a Z4	Very Low	**Remove** (Exempt, dead/dying).
15	East of Tree 14.	*Corymbia maculata* Spotted Gum	5	12	17 20	2.0 1.7	Immature, poor condition, with a cavity at the base of the tree.	4c Z5	Very Low	**Remove** (Exempt, risk to safety).
16	North-eastern corner.	*Corymbia citriodora* Lemon-Scented Gum	2	4	5 5	2.0 1.5	Juvenile, good condition.	2a Z1	Very Low	**Remove** (Exempt, less than 5m height).
17	North-eastern corner.	*Corymbia citriodora* Lemon-Scented Gum	16	25	44 50	5.3 2.5	Semi-mature, moderate condition, previously pruned, with minor decay.	2d Z10	Moderate	**Remove** and **replenish.**

Tree No.	Location	Botanical Name Common Name	Crown (m)	Height (m)	DBH* DRC* (cm)	TPZ* SRZ* (m)	Tree Health & Condition	TULE* A-Z	Retention Value	Control Measures
18	North-eastern corner.	*Corymbia citriodora* Lemon-Scented Gum	8	16	30 40	3.6 2.3	Immature, with a lean to the east.	2d Z10	Low-Moderate	**Remove** and **replenish.**
19-20	**Removed prior to this report.**									
21	Eastern boundary.	*Jacaranda mimosifolia* Jacaranda	8	8	17/28 45	4.0 2.4	Semi-mature, growing from an old stump.	3d Z10	Moderate	**Remove** and **replenish.**
22-29	**Removed prior to this report.**									
30	South-eastern area.	*Species unknown* (stag)	6	10	50 53	6.0 2.5	Dead, with no hollows.	4c Z4	Very Low	**Remove** (Exempt, dead/dying).
31	West of Tree 30.	*Lophostemon confertus* Brush Box	10	12	40/40/50 76	9.0 3.0	Immature, good condition but poor development, with minor dehydration.	2a Z10	Moderate	**Remove** and **replenish.**
32a	West of Tree 31.	*Ligustrum lucidum* Broad-Leaf Privet	12	8	40 42	4.8 2.3	Immature, good condition but poor development.	5f Z3	Very Low	**Remove** (Exempt, weed species).
32b	West of Tree 31.	*Ligustrum lucidum* Broad-Leaf Privet	12	8	40 42	4.8 2.3	Immature, good condition but poor development.	5f Z3	Very Low	**Remove** (Exempt, weed species).
33	Southern area.	*Liquidambar formosana* Chinese Sweet Gum	16	18	70 75	8.4 2.9	Semi-mature, good condition.	2a Z10	Moderate	**Remove** and **replenish.**
34	Council street tree.	*Platanus orientalis* Oriental Plane	14	20	40 50	4.8 2.5	Immature, good condition.	2a A1	High	**Retain** and **protect.**
35	Southern boundary.	*Jacaranda mimosifolia* Jacaranda	10	12	20/30 40	4.3 2.3	Immature, good condition but poor development.	2a A1	Moderate	**Retain** and **protect.**
36	Southern boundary.	*Syzygium australe* Brush Cherry	12	14	50 55	6.0 2.6	Semi-mature, good condition.	2a A1	Moderate	**Retain** and **protect.**
37	Southern boundary.	*Liquidambar styraciflua* American Sweet Gum	20	22	75 80	9.0 3.0	Semi-mature, good condition.	2d A1	High	**Retain** and **protect** (Branch Mapping Required).
38	Western boundary.	*Olea europaea* Olive	8	8	20/20 40	3.4 2.3	Semi-mature, good condition but poor development.	2a A1	Low	**Remove** (Exempt, weed species).
39	Western boundary.	*Erythrina x sykesii* Common Coral Tree	20	18	110 150	13.2 3.9	Mature, dead/dying, with a broken branch.	4a Z3	Low	**Remove** (Exempt, weed species).
40	Western boundary.	*Erythrina x sykesii* Common Coral Tree	20	18	46/63 87	9.4 3.1	Mature, moderate condition, with a broken lateral.	2d Z3	Low	**Remove** (Exempt, weed species).
41	Western boundary.	*Lophostemon confertus* Brush Box	16	14	92 89	11.0 3.2	Mature, good condition but poor development.	2a Z10	Moderate	**Remove** and **replenish.**
42 (x 2)	5 metres west of fence.	*Lagerstroemia indica* Crepe Myrtle & *Ligustrum lucidum* Broad-Leaf Privet	6	10	10 (x 6) 40	2.9 2.3	Semi-mature, growing with privet.	2d Z3	Low-Moderate	**Remove** and **replenish** Crepe Myrtle. **Remove** Privet (Exempt, weed species).
42b	5 metres west of fence.	*Lagerstroemia indica* Crepe Myrtle	6	8	10 (x 3) 30	2.0 2.0	Semi-mature, multi-stemmed, with a cavity at the base of the tree.	2d Z10	Low-Moderate	**Remove** and **replenish.**
43	Western boundary.	*Lagerstroemia indica* Crepe Myrtle	5	8	30 32	3.6 2.1	Immature, good condition but poor development.	2d A1	Low	**Retain** and **protect.**

Tree No.	Location	Botanical Name Common Name	Crown (m)	Height (m)	DBH* DRC* (cm)	TPZ* SRZ* (m)	Tree Health & Condition	TULE* A-Z	Retention Value	Control Measures
44	Western boundary.	*Lagerstroemia indica* Crepe Myrtle	7	8	14 (x 8) 60	4.8 2.7	Immature, good condition but poor development, with a suppressed canopy.	2d Z10	Low-Moderate	**Remove** and **replenish.**
45	Western boundary.	*Cinnamomum camphora* Camphor Laurel	14	15	20/53 65	6.8 2.8	Immature, good condition but poor development.	2d Z10	Low-Moderate	**Remove** and **replenish.**
45a (x 4)	Western boundary.	*Cinnamomum camphora* Camphor Laurel	4-5	10-12	10-20 15-25	2.4 1.9	Immature, good condition but poor development, with suckering re-growth.	2d Z10	Low	**Remove** and **replenish.**
46	Western boundary.	*Lagerstroemia indica* Crepe Myrtle	8	9	40 42	4.8 2.3	Immature, good condition but poor development.	2a Z10	Low-Moderate	**Remove** and **replenish.**
47	Western boundary.	*Lagerstroemia indica* Crepe Myrtle	2	3	10 10	2.0 1.5	Immature, good condition but poor development, with four (4) main stems.	1a Z1	Low	**Remove** (Exempt, less than 5m height).
48	Western boundary.	*Lagerstroemia indica* Crepe Myrtle	6	8	10 (x 4) 50	2.4 2.5	Semi-mature, good condition but poor development, with decay.	3a Z10	Low-Moderate	**Remove** and **replenish.**
49	**Removed prior to this report.**									
50	Western boundary.	*Lagerstroemia indica* Crepe Myrtle	5	6	20 20	2.4 1.7	Immature, good condition.	2d A1	Low	**Retain** and **protect.**
51	Western boundary.	*Lagerstroemia indica* Crepe Myrtle	3	4	20 20	2.4 1.7	Immature, good condition but poor development.	2d Z10	Low	**Remove** (Exempt, less than 5m height).
52	Western boundary.	*Ligustrum lucidum* Broad-Leaf Privet	6	6	10/10/15 30	2.5 2.0	Semi-mature, moderate condition.	5f Z3	Very Low	**Remove** (Exempt, weed species).
53	On embankment.	*Pittosporum undulatum* Sweet Pittosporum	6	5	15 16	2.0 1.5	Immature, moderate condition, with decay, and termite damage.	3d A2	Low	**Retain** and **protect.**
54	Western Boundary.	*Lagerstroemia indica* Crepe Myrtle	3	6	10 10	2.0 1.5	Juvenile, dead/dying, with multiple stems.	4a Z4	Low	**Remove** (Exempt, dead/dying).
55	Western Boundary.	*Cinnamomum camphora* Camphor Laurel	8	12	20/24/24/35 60	6.4 2.7	Immature, good condition but poor development, with an inclusion at 1m height.	2d Z10	Low-Moderate	**Remove** and **replenish.**
56	Western Boundary.	*Lagerstroemia indica* Crepe Myrtle	6	3	10 10	2.0 1.5	Immature, dead/dying, with multiple stems, and dead wood.	4a Z4	Low	**Remove** (Exempt, dead/dying).
57	Western Boundary.	*Ligustrum lucidum* Broad-Leaf Privet	6	6	5/12/12/12 22	2.5 1.8	Immature, good condition but poor development.	5f Z3	Very Low	**Remove** (Exempt, weed species).
58	Western Boundary.	*Corymbia citriodora* Lemon-Scented Gum	10	20	42 44	5.0 2.3	Immature, with physical damage on the stem at 6m height, and an inclusion at 8m height.	2d A2	Moderate	**Retain** and **protect.**
59	Western Boundary.	*Lagerstroemia indica* Crepe Myrtle	2	5	5/10 15	2.0 1.5	Juvenile, dead/dying.	4a Z4	Low	**Remove** (Exempt, dead/dying).
60a	Western Boundary.	*Species unknown* (stag)	4	15	5 5	2.0 1.5	Dead, with no hollows.	4a Z4	Very Low	**Remove** (Exempt, dead).
60b	Western Boundary.	*Species unknown* (stag)	4	15	5 5	2.0 1.5	Dead, with no hollows.	4a Z4	Very Low	**Remove** (Exempt, dead).
61	Western Boundary.	*Phoenix canariensis* Canary Island Date Palm	8	8	50 60	6.0# 2.7	Semi-mature, good condition but poor development.	2a A1	Moderate	**Retain** and **protect.**

Tree No.	Location	Botanical Name Common Name	Crown (m)	Height (m)	DBH* DRC* (cm)	TPZ* SRZ* (m)	Tree Health & Condition	TULE* A-Z	Retention Value	Control Measures
61a	Western Boundary.	*Olea europaea* Olive	8	7	10/10/20 40	2.9 2.3	Immature, good condition but poor development, with a spreading habit.	2d Z3	Low-Moderate	**Remove** (Exempt, weed species).
62	Western Boundary.	*Glochidion ferdinandi* Cheese Tree	3	3	10/10 15	2.0 1.5	Immature, poor condition, with 50% dehydration.	3d A2	Low	**Retain** and **protect.**
63	Western Boundary.	*Ligustrum lucidum* Broad-Leaf Privet	3	5	15/15 20	2.5 1.7	Semi-mature, dead/dying.	4c Z4	Low	**Remove** (Exempt, dead/dying).
64	Western Boundary.	*Lagerstroemia indica* Crepe Myrtle	8	8	35 40	4.2 2.3	Semi-mature, good condition but poor development, with multiple stems.	2d Z10	Low-Moderate	**Remove** and **replenish.**
65	Western Boundary.	*Lagerstroemia indica* Crepe Myrtle	8	8	40 42	4.8 2.3	Immature, good condition but poor development, with decay.	2d Z10	Low-Moderate	**Remove** and **replenish.**
66	Western Boundary.	*Lagerstroemia indica* Crepe Myrtle	6	6	15/15/15 20	3.1 1.7	Semi-mature, dead/dying, with decay.	4a Z4	Low-Moderate	**Remove** (Exempt, dead/dying).
67	Western Boundary.	*Lagerstroemia indica* Crepe Myrtle	5	6	10/10/10 20	2.0 1.7	Semi-mature, dead/dying, with physical damage, and a cavity.	4c Z4	Low	**Remove** (Exempt, dead/dying).
68	**Removed prior to this report.**									
69 (x 2)	2b Fleet Street.	*Ligustrum lucidum* Broad-Leaf Privet & *Cinnamomum camphora* Camphor Laurel	10	10	14/25/25/35 60	6.2 2.7	Semi-mature, good condition but poor development, with multiple stems.	2d Z3	Low-Moderate	**Remove** and **replenish** Camphor Laurel **Remove** Privet (Exempt, weed species).

The TPZ of palms, other monocots, cycads and tree ferns should not be less than 1 metre outside the crown projection.

3.5 OBSERVATIONS

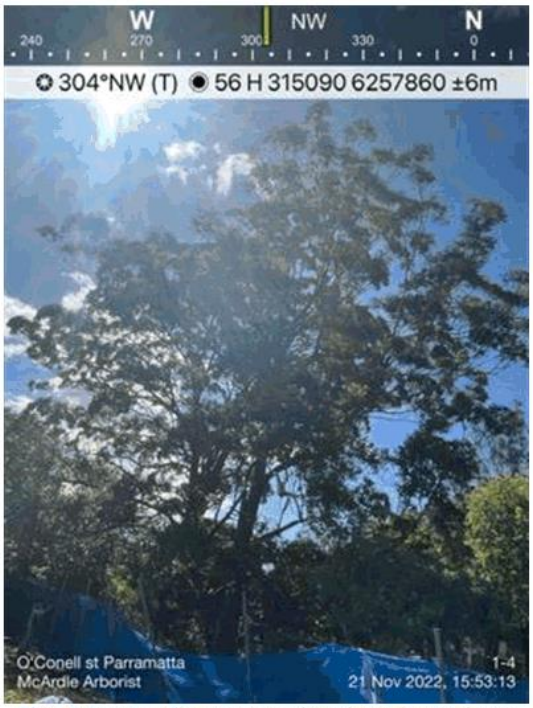


Plate 1: *Tree 1 and 2a, Ficus spp. (Ficus), Tree 2, Eucalyptus microcorys (Tallowwood), Tree 3, Phoenix canariensis (Canary Island Date Palm) and Tree 4, Eucalyptus piperita (Sydney Peppermint).*

Plate 2: *Tree 2, Eucalyptus microcorys (Tallowwood).*

Plate 3: *Tree 2, Eucalyptus microcorys (Tallowwood).*

Plate 4: *Tree 4, Eucalyptus piperita (Sydney Peppermint).*

Plate 5: *Trees 10, 11 12and 14.*

Plate 6: *Tree 13, Eucalyptus cinerea (Argyle Apple).*

Plate 7: *Tree 6, a stag.*

Plate 8: *Tree 14, dead stag.*

Plate 9: *Tree 15, Corymbia maculata (Spotted Gum).*

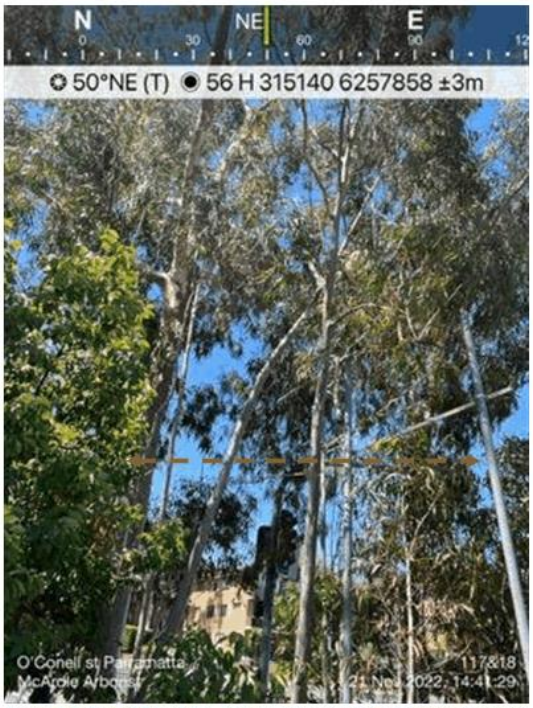


Plate 10: *Tree 17 and 18, Corymbia citriodora (Lemon-Scented Gum).*

Plate 11: *Tree 30, a stag.*

Plate 12: *Tree 33, Liquidambar styraciflua (Liquidambar).*

Plate 13: *Tree 34, Platanus orientalis (Oriental Plane).*

Plate 14: *Tree 33 and 37, Liquidambar styraciflua (Liquidambar).*

Plate 15: *Tree 42, Lagerstroemia indica (Crepe Myrtle) and Ligustrum lucidum (Privet).*

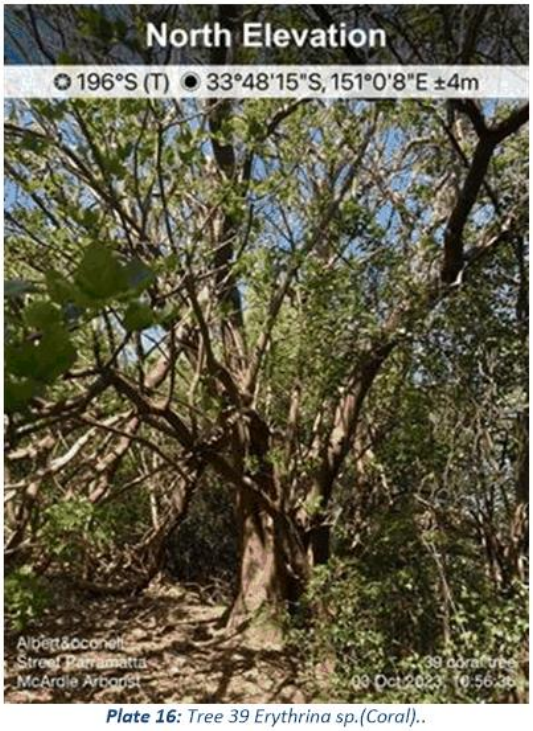


Plate 16: *Tree 39 Erythrina sp.(Coral)..*

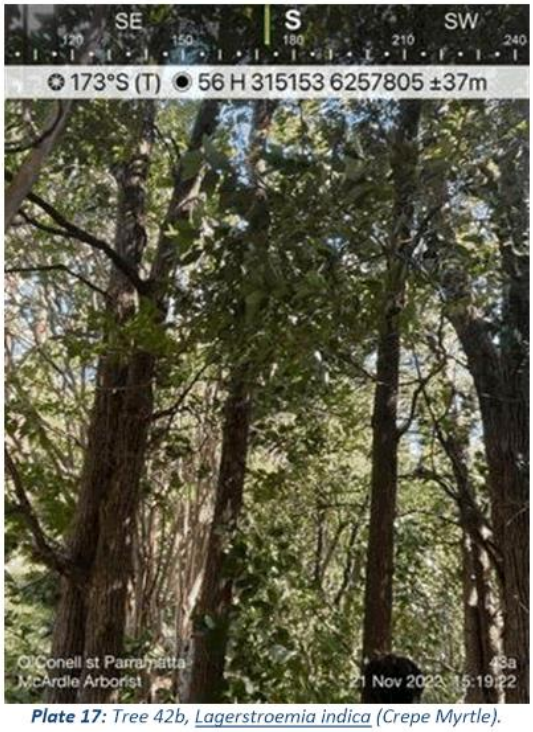


Plate 17: *Tree 42b, Lagerstroemia indica (Crepe Myrtle).*

Plate 18: *Tree 54, a stag.*

Plate 19: *Tree 56, a stag.*

Plate 20: *Tree 59, a stag.*

Plate 21: *Tree group 60 is two dead stags.*

Plate 22: *Tree 61, Phoenix canariensis (Phoenix Palm).*

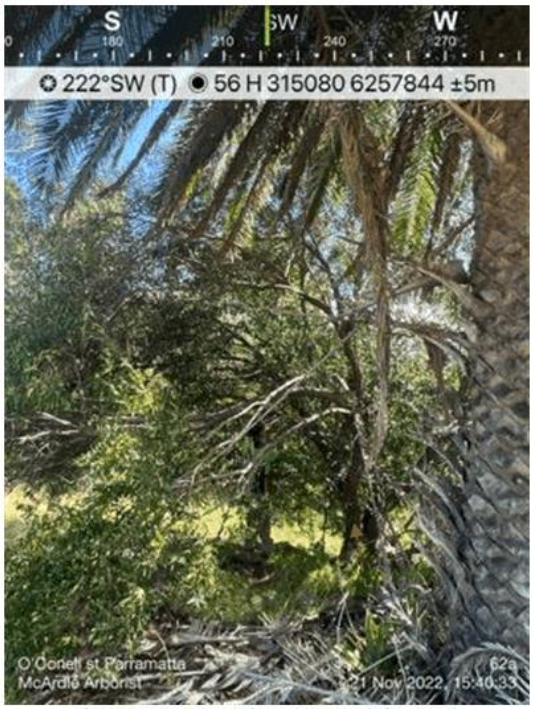


Plate 23: *Tree 61a, Olea europaea (Olive tree).*

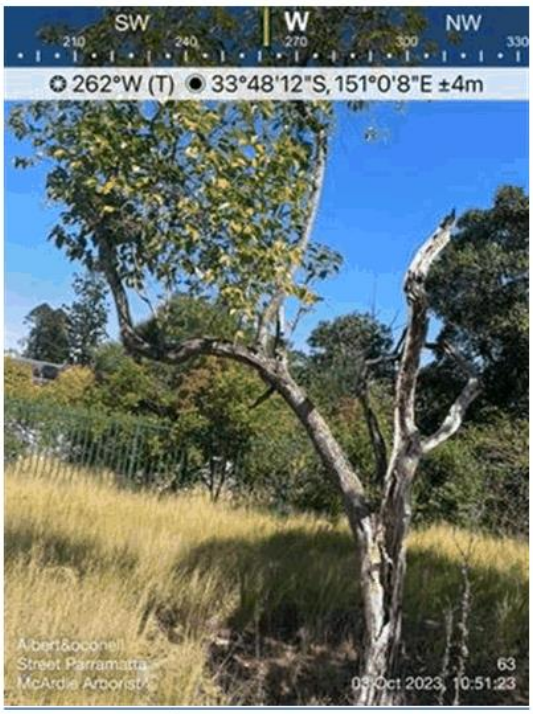


Plate 24: *Tree 63, a stag.*

Plate 25: *Tree 66, a stag.*

Plate 26: *Tree 67, a stag.*

4. DISCUSSION

4.1 GENERAL DISCUSSION OF TREES ON SITE

4.1.1 Approximately sixty-nine (69) trees/tree groups on site and in the adjacent surrounding area were assessed.

4.1.2 Sixteen (16) trees numbered 1, 2, 2a, 3, 5, 12, 34, 35, 36, 37, 43, 50, 53, 58, 61 and 62 are proposed for **retention**; and forty-six (46) trees/tree groups numbered 4, 6, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 21, 30, 31, 32a, 32b, 33, 38, 39, 40, 41, 42, 42b, 44, 45, 45a, 46, 47, 48, 51, 52, 54, 55, 56, 57, 59, 60a, 60b, 61a, 63, 64, 65, 66, 67 and 69 are proposed for **removal** to support the proposed works.

4.1.3 One (1) tree numbered 37 requires **pruning** to provide clearance around the proposed apartment building. A branch mapping report is required to assess the extent of pruning required for this tree.

4.1.4 Tree 63 has an issue with a wasp nest (see Plate 24), and as a result, Tree 61a was left untagged (see Plate 23).

4.2 SIGNIFICANCE IN THE LANDSCAPE AND USEFUL LIFE EXPECTANCY

4.2.1 Tree 2, *Eucalyptus microcorys* (Tallowwood), has a **short** useful life expectancy rating (3a) and an estimated life duration of 5 to 15 years. As the tree is a native plant species of the Sydney region and has a large live crown size exceeding 200m^2, the tree is considered to have **high** value in the landscape.

4.2.2 Trees 1, 34 and 37 have **medium** useful life expectancy ratings (2a/2d) and estimated life durations of 15 to 40 years. As the trees are exotic plant species and have large live crown sizes exceeding 100m^2, the trees are considered to have **moderate** value in the landscape.

4.3 RETENTION VALUES

4.3.1 Retention values are determined by considering both TULE and Significance in The Landscape (Appendix E). The retention values of the assessed trees are as follows:

Table 5: *Retention Values.*

High (4 trees)	Moderate (13 trees)	Low-Moderate (18 trees/tree groups)	Low (17 trees/tree groups)	Very Low (10 trees)
1, 2, 34, 37.	4, 9, 11, 13, 17, 21, 31, 33, 35, 36, 41, 58, 61.	2a, 6, 8, 10, 12, 18, 42, 42b, 44, 45, 46, 48, 55, 61a, 64, 65, 66, 69.	3, 5, 38, 39, 40, 43, 45a, 47, 50, 51, 53, 54, 56, 59, 62, 63, 67.	4, 15, 16, 30, 32a, 32b, 52, 57, 60a, 60b.

4.3.2 The trees of **high** retention value are numbered 1, 2, 34 and 37. These trees are worthy of preservation and consideration should be given to their retention.

4.3.3 The trees of **moderate** retention value are numbered 4, 9, 11, 13, 17, 21, 31, 33, 35, 36, 41, 58 and 61. These trees are desirable for retention and should be retained if possible.

4.3.4 The trees of **low-moderate** retention value are numbered 2a, 6, 8, 10, 12, 18, 42, 42b, 44, 45, 46, 48, 55, 61a, 64, 65, 66 and 69. These trees require substantial remediation and are only suitable for retention in the short term.

4.3.5 The trees of **low** retention value are numbered 3, 5, 38, 39, 40, 43, 45a, 47, 50, 51, 53, 54, 56, 59, 62, 63 and 67. These trees do not have special ecological or amenity value and are not considered to be worthy of preservation.

4.3.6 The trees of **very low** retention value are numbered 4, 15, 16, 30, 32a, 32b, 52, 57, 60a and 60b. These trees are considered to be potentially hazardous or are noxious weeds or very poor specimens.

4.4 IMPACT ASSESSMENT

4.4.1 The assessment determines how the proposed development will impact the assessed trees and their canopies. The impacts are classified as minor or major Tree Protection Zone (TPZ) encroachments.

Table 6: *TPZ Encroachments.*

Tree No.	*Botanical Name* (Common Name)	TPZ Encroachment	Category
2	*Eucalyptus microcorys* (Tallowwood)	2.9% (+4.6% canopy)	**Minor** (less than 10%)
4	*Eucalyptus piperita* (Sydney Peppermint)	25.9% (+ 20.2% canopy)	**Major** (more than 10%)
6	*Liquidambar styraciflua* (American Sweet Gum)	27.2%	**Major** (more than 10%)
8	*Fraxinus spp.* (Ash)	2.0%	**Major** (SRZ encroachment)
9	*Fraxinus spp.* (Ash)	25.2%	**Major** (more than 10%)
10	*Grevillea robusta* (Silky Oak)	100%	**Major** (more than 10%)
11	*Fraxinus angustifolia* (Claret Ash)	100%	**Major** (more than 10%)
13	*Eucalyptus cinerea* (Argyle Apple)	15.4% (+51.2% canopy)	**Major** (more than 10%)
14	*Species unknown* (stag)	95.9%	**Major** (more than 10%)
15	*Corymbia maculata* (Spotted Gum)	100%	**Major** (more than 10%)
16	*Corymbia citriodora* (Lemon-Scented Gum)	(100% canopy)	**Major** (more than 10%)
17	*Corymbia citriodora* (Lemon-Scented Gum)	(34.7% canopy)	**Major** (more than 10%)
18	*Corymbia citriodora* (Lemon-Scented Gum)	(35.7% canopy)	**Major** (more than 10%)
21	*Jacaranda mimosifolia* (Jacaranda)	1.5% (+28.8% canopy)	**Major** (more than 10%)
30	*Species unknown* (stag)	63.6%	**Major** (more than 10%)
31	*Lophostemon confertus* (Brush Box)	97.5% (+ 87.4% canopy)	**Major** (more than 10%)
32a	*Ligustrum lucidum* (Broad-Leaf Privet)	100%	**Major** (more than 10%)
32b	*Ligustrum lucidum* (Broad-Leaf Privet)	100%	**Major** (more than 10%)
33	*Liquidambar formosana* (Chinese Sweet Gum)	64.2% (+91.6% canopy)	**Major** (more than 10%)
37	*Liquidambar styraciflua* (American Sweet Gum)	1.2% (+24.4% canopy)	**Major** (more than 10%)
39	*Erythrina x sykesii* (Common Coral Tree)	8.7%	**Minor** (less than 10%)
40	*Erythrina x sykesii* (Common Coral Tree)	2.0%	**Minor** (less than 10%)
41	*Lophostemon confertus* (Brush Box)	30.5% (+61.2% canopy)	**Major** (more than 10%)
44	*Lagerstroemia indica* (Crepe Myrtle)	79.9%	**Major** (more than 10%)
45	*Cinnamomum camphora* (Camphor Laurel)	35.5%	**Major** (more than 10%)
45a	*Cinnamomum camphora* (Camphor Laurel)	28.6%	**Major** (more than 10%)
46	*Lagerstroemia indica* (Crepe Myrtle)	14.1%	**Major** (more than 10%)
55	*Cinnamomum camphora* (Camphor Laurel)	3.4%	**Minor** (less than 10%)
61	*Phoenix canariensis* (Canary Island Date Palm)	3.8%	**Minor** (less than 10%)
64	*Lagerstroemia indica* (Crepe Myrtle)	2.5%	**Minor** (less than 10%)

Tree No.	*Botanical Name* (Common Name)	TPZ Encroachment	Category
65	*Lagerstroemia indica* (Crepe Myrtle)	7.9%	**Minor** (less than 10%)

4.4.2 Twenty-six (26) trees numbered 4, 6, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 21, 30, 31, 32a, 32b, 33, 37, 41, 44, 45, 45a and 46 will have major anticipated impacts from TPZ encroachments of greater than 10% and/or encroachments within their canopies. Of these trees, one (1) tree numbered 37 is to be retained with pruning to provide clearance around the proposed apartment building. A branch mapping report is required to assess the extent of clearance pruning required for this tree.

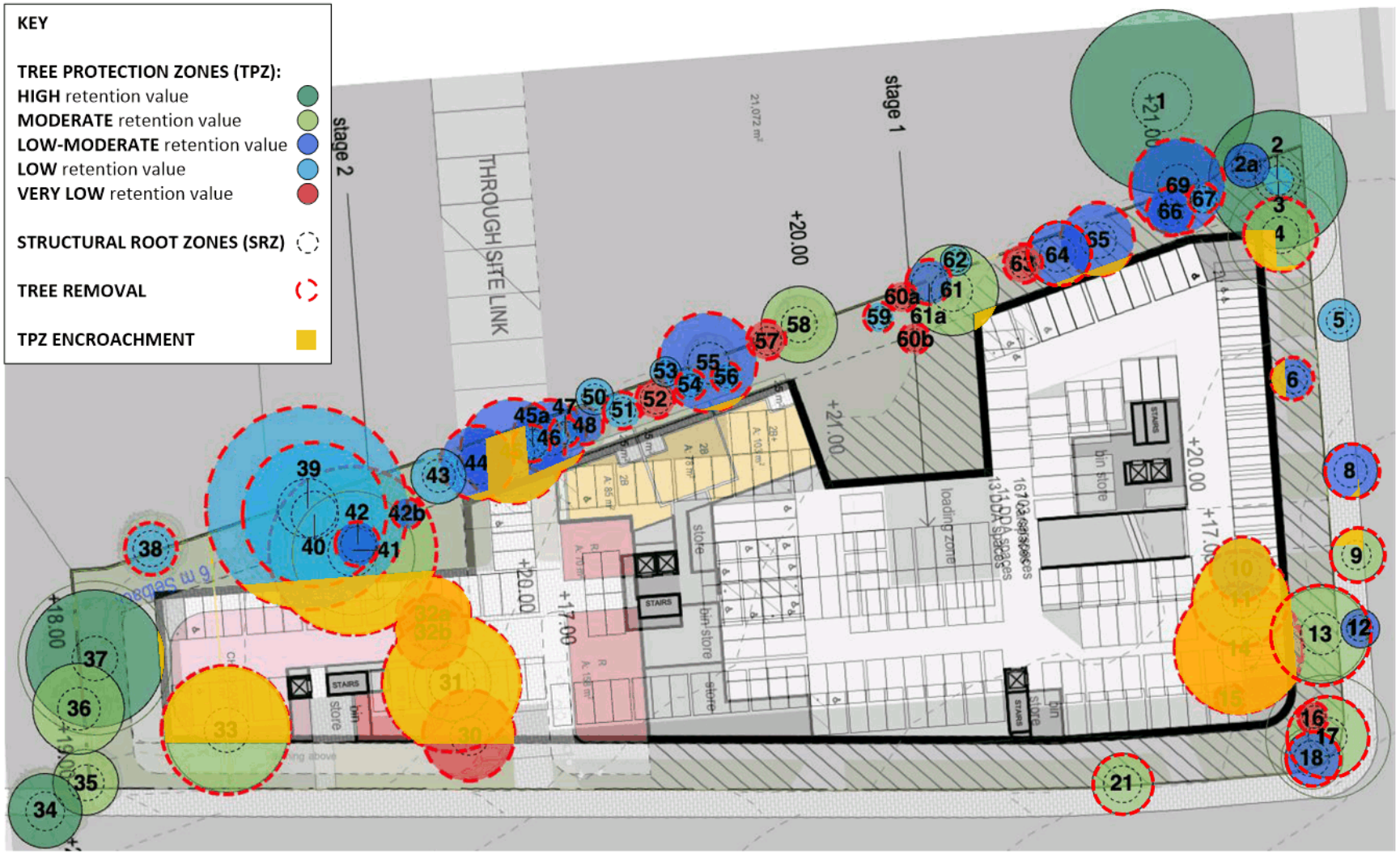


Figure 5: *TPZ encroachments from the proposed development. Encroachments are highlighted in orange.*

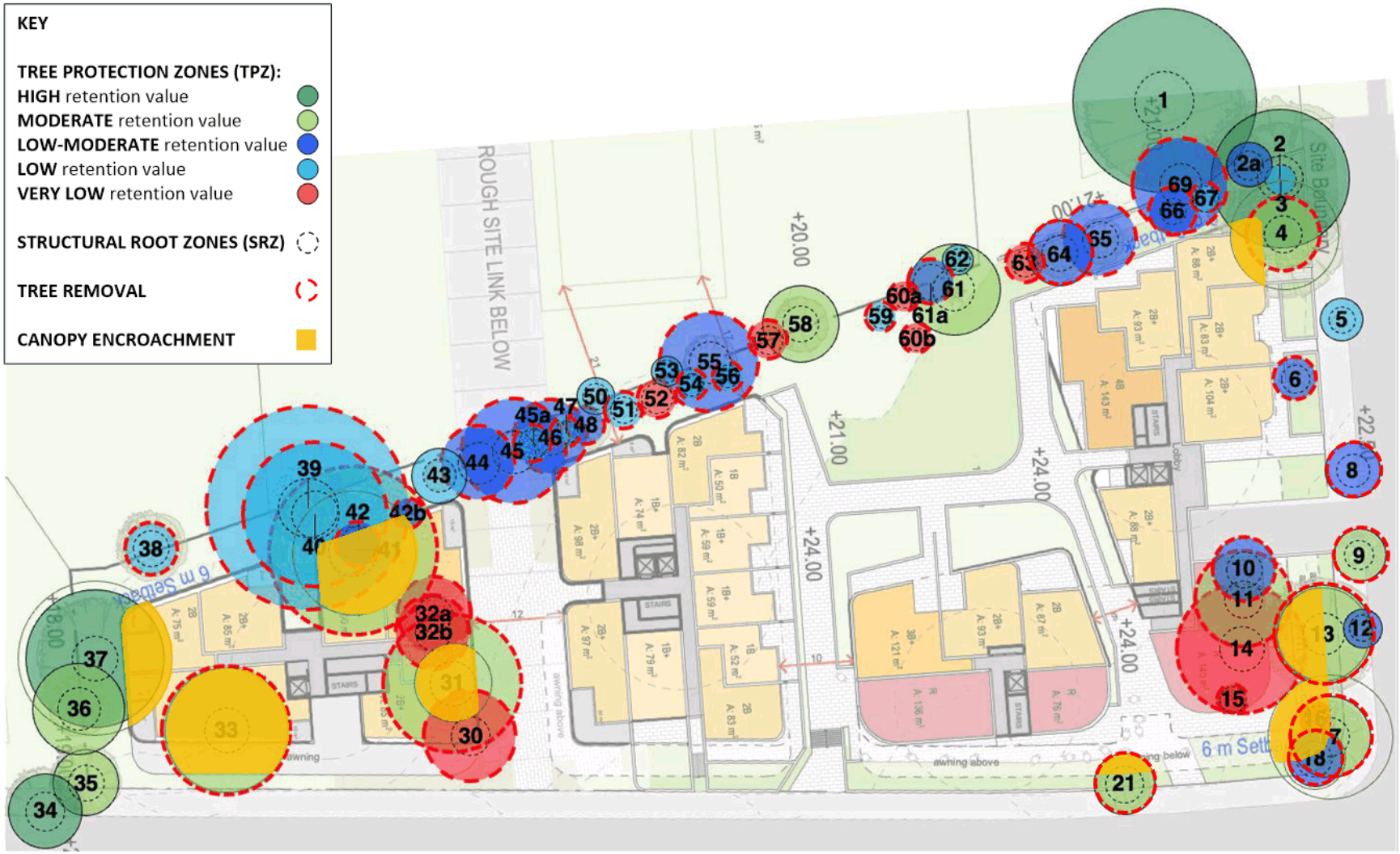


Figure 6: *Canopy encroachments of Trees 2, 4, 13,17, 18, 21, 31, 33, 37 and 41 from the proposed development. Encroachments are highlighted in orange.*

5. RECOMMENDATIONS

5.1 TREE WORKS

Table 7: *Tree Works.*

Retain (16 trees)	Prune (1 tree)	Remove (46 trees)
1, 2, 2a, 3, 5, 12, 34, 35, 36, 37, 43, 50, 53, 58, 61, 62.	37.	4, 6, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 21, 30, 31, 32a, 32b, 33, 38, 39, 40, 41, 42, 42b, 44, 45, 45a, 46, 47, 48, 51, 52, 54, 55, 56, 57, 59, 60a, 60b, 61a, 63, 64, 65, 66, 67, 69.

5.1.1 **Retain** sixteen (16) trees numbered 1, 2, 2a, 3, 5, 12, 34, 35, 36, 37, 43, 50, 53, 58, 61 and 62. Of these trees:

- One (1) tree numbered 37 will have canopy encroachments of greater than 10%. The tree is to be retained with pruning to provide clearance around the proposed apartment building. A branch mapping report is required to assess the extent of clearance pruning required for this tree.
- Fifteen (15) trees numbered 1, 2, 2a, 3, 5, 12, 34, 35, 36, 43, 50, 53, 58, 61 and 62 will have minor or no encroachments from the proposed development.

5.1.2 **Remove** forty-six (46) trees/tree groups numbered 4, 6, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 21, 30, 31, 32a, 32b, 33, 38, 39, 40, 41, 42, 42b, 44, 45, 45a, 46, 47, 48, 51, 52, 54, 55, 56, 57, 59, 60a, 60b, 61a, 63, 64, 65, 66, 67 and 69. Of these trees:

- Twenty-five (25) trees numbered 4, 6, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 21, 30, 31, 32a, 32b, 33, 41, 44, 45, 45a and 46 will have major anticipated impacts from TPZ and/or canopy encroachments of greater than 10%.
- Twenty-seven (27) trees numbered 6, 10, 11, 14, 15, 16, 30, 32a, 32b, 38, 39, 40, 42, 47, 51, 52, 54, 56, 57, 59, 60a, 60b, 61a, 63, 66, 67 and 69 are exempt from preservation under Parramatta DCP 2023[7] and are not worthy of special measures to ensure their preservation.

5.1.3 **Suitably Qualified Arborist:** Most councils require written consent prior to tree pruning or removal. Tree contractors must have a minimum AQF Level 3 Certificate in Arboriculture and work in accordance with Australian Standard® AS 4373-2007 – Pruning of Amenity Trees, the Work Health & Safety (WHS) Act 2011 and the WHS Regulations 2017, the SafeWork NSW – Guide to Managing Risks of Tree Trimming and Removal Work 2016, and the Code of Practice for The Amenity Tree Industry 1998. Work near powerlines should be carried out in accordance with the Code of Practice for Work Near Overhead Power Lines. Tree contractors shall be members of Tree Contractors Association Australia (TCAA) or Arborists Australia (AA) and hold Workers Compensation and Public Liability Insurance. Tree contractors must liaise with the consulting arborist to ensure that tree pruning and removal works are completed according to specification.

5.1.4 **Canopy Cover Loss:** Replenish tree removals with new tree plants within the site to compensate for loss of amenity in accordance with council requirements. To compensate for the reduced canopy cover, planting of indigenous trees which are appropriate to the local environment and provide koala habitat should be considered using the canopy cover formula $((½ \times \text{canopy diameter})^2 \times \pi)$. The removal of forty-six (46) trees/tree groups will result in a canopy cover loss of approximately **3,248.01m²**. Twenty-seven (27)

[7] *https://www.cityofparramatta.nsw.gov.au/document/40611*

trees numbered 6, 10, 11, 14, 15, 16, 30, 32a, 32b, 38, 39, 40, 42, 47, 51, 52, 54, 56, 57, 59, 60a, 60b, 61a, 63, 66, 67 and 69 are exempt from preservation under Parramatta DCP 2023[8] and do not require replenishment.

5.1.5 **Replenishment Planting:** Nineteen (19) trees of 45L potted volumes that are capable of reaching canopy diameters at maturity of 14 to 15 metres are required. In accordance with Council requirements, new tree plantings should be a native species or from a vegetation community present on site to compensate for loss of amenity. Replenishment is to be completed in accordance with planting specifications from NATSPEC (Clark 2003) and Australian Standard® AS 2303-2018 – Tree Stock for Landscape Use (Appendix F).

5.1.6 **Mulch:** Maintain aged *Eucalyptus spp.* mulch around all the retained and replenished trees in accordance with Australian Standard® AS 4454-2003 – Compost, Soil Conditioners and Mulches.

5.1.7 **Watering Schedule:** Maintain a watering schedule for replenished trees. A 45L potted volume requires approximately 35L of water daily (Trees Impact: 2021).

5.2 TREE PROTECTION MEASURES

5.2.1 Minor TPZ encroachments must be compensated for elsewhere and be contiguous with the TPZs of the assessed trees. All measures must be certified by an AQF Level 5 arborist in accordance with Council requirements and Australian Standard® AS 4970-2009 – Protection of Trees on Development Sites.

Table 8: *Tree Management Plan.*

Tree Management Measures	Tree No.
Mulch Ground Cover Protection	2, 2a, 36, 37, 43, 61.
Tree Protection Fencing	1, 2, 2a, 3, 35, 36, 37, 43, 50, 53, 58, 61, 62.
Tree Trunk Protection	5, 12, 34.
Branch Mapping Report	37.

5.2.2 **Mulch ground cover protection** is required over the TPZs (where viable) of six (6) trees numbered 2, 2a, 36, 37, 43 and 61 to minimise soil compaction and root damage. This is to consist of 75mm depth layers of clean and certified *Eucalyptus spp.* mulch.

5.2.3 **Tree protection fencing** is required around the TPZs (where viable) of thirteen (13) trees numbered 1, 2, 2a, 3, 35, 36, 37, 43, 50, 53, 58, 61 and 62 to preserve their root zones. This is to consist of 1.8-metre-high steel mesh fencing anchored with concrete blocks, or, red high-visibility plastic mesh fencing attached to star pickets. Tree protection fencing may be relocated with the project arborist's permission to access the work site. TPZ signage with the project arborist's contact details is to be attached to the tree protection fencing and read 'Tree Protection Zone: Do Not Enter' written in large font with waterproof ink, in accordance with Australian Standard® AS 1319-1994 – Safety Signage.

5.2.4 **Tree trunk protection** is required around the stems of three (3) trees numbered 5, 12 and 34.This is to consist of hessian, padding or geotextile fabric wrapped around the trees' trunk, with 1.8 metre lengths of timber spaced at small intervals and strapped over the top of the padding, not nailed or screwed into the trees.

[8] *https://www.cityofparramatta.nsw.gov.au/document/40611*

5.3 FURTHER INVESTIGATION

5.3.1 A **branch mapping report** is to be prepared by an AQF Level 5 arborist prior to construction to assess the extent of clearance pruning required for one (1) tree numbered 37.

5.4 SITE MONITORING

5.4.1 An AQF Level 5 arborist must monitor trees throughout the construction process. The site manager should notify the project arborist prior to works within the TPZs of the retained trees.

Table 9: *Project Arborist Inspections.*

SITE INSPECTIONS DURING CONSTRUCTION			
Stage	General Schedule of Work	Person Responsible	Certification by Project Arborist
Pre-Construction	Induction of tree protection systems. A waterproof copy of the tree protection plan is to be displayed within the site manager's office or on the front fence adjacent to the DA signage for viewing by contractors. An arborist can induct the contractors who have access to tree protection areas.	Project Engineer or Site Manager	Induction and Logbook Certification.
	Root mapping investigations to locate roots within footprint of development.	Project Arborist	Root Mapping Report
	Branch mapping to assess the extent of canopy clearing required to accommodate awnings and buildings.	Project Arborist	Branch Mapping Report
	Prior to demolition, earthworks or site clearing, clearly mark trees for removal (spray paint on trunks).	Competent Person	n/a
	Tree Protection Systems (for retained trees) must be installed prior to demolition, include mulching in TPZ.	Competent Person	Pre-Construction Tree Protection Certificate
Construction	Scheduled inspection of trees during construction-usually monthly.	Project Arborist	Inspection and Certification
	Supervise and protect any excavations within the TPZ of retained trees.	Project Arborist	Supervision and Certification
Post-Construction	Final inspection after construction and prior to the removal of protection measures.	Project Arborist	Final Tree Protection Certificate

6. HOLDING POINTS

6.1 Tree protection measures are to be installed around the retained trees and certified by the project arborist prior to any demolition, development, or soil stripping. The protected area is an exclusion zone. Protection measures should not be removed or altered unless agreed by the supervising arborist. Ground protection should support all anticipated loading and prevent compaction in the TPZ.

6.2 All works carried out within the TPZs of the retained trees must be supervised by an AQF Level 5 arborist. Activities prohibited in TPZs are listed in 8. Tree Management Specifications.

6.3 A branch mapping report is to be prepared by an AQF Level 5 arborist prior to construction to assess the extent of clearance pruning required for one (1) tree numbered 37.

6.5 Tree pruning and removal works are to be completed by qualified AQF Level 3 arborists in accordance with Australian Standard® AS 4373-2007 – Pruning of Amenity Trees and SafeWork NSW – Guide to Managing Risks of Tree Trimming and Removal Works. Tree contractors shall be members of Tree Contractors Association Australia (TCAA) or Arborists Australia (AA) and hold Workers Compensation and Public Liability Insurance. Tree contractors must liaise with the consulting arborist to ensure that pruning and removal works are completed in accordance with specification.

6.6 Nineteen (19) trees of 45L potted volumes are required. The trees are to be planted in suitable locations at least 3-5 metres away from buildings and away from power lines, hard-surface infrastructure and underground services. The replenishment trees are to be certified by an AQF Level 5 arborist and planted in accordance with Australian Standard® AS 2303-2018 – Tree Stock for Landscape Use.

6.7 Inspections monthly or every second month are to be carried out by an AQF Level 5 arborist to ensure the retained trees are preserved in viable condition, and to certify that tree protection measures are compliant and being maintained around the trees.

6.8 Hoarding, waste and amenities (HWA) should be stored outside the TPZs of the retained trees.

6.9 If any of the retained trees are damaged during the proposed development, then a remedial plan must be prepared by an AQF Level 5 arborist for each damaged tree.

7. MAPS

MAP A TREE RETENTION AND REMOVAL PLAN

Retain sixteen (16) trees numbered 1, 2, 2a, 3, 5, 12, 34, 35, 36, 37, 43, 50, 53, 58, 61 and 62.	**Remove** forty-six (46) trees/tree groups numbered 4, 6, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 21, 30, 31, 32a, 32b, 33, 38, 39, 40, 41, 42, 42b, 44, 45, 45a, 46, 47, 48, 51, 52, 54, 55, 56, 57, 59, 60a, 60b, 61a, 63, 64, 65, 66, 67 and 69.

Plans Referenced: Basement 01, Lower Ground Floor and Upper Ground Floor prepared by DKO Architecture, dated 6th of February, 2024.

MAP B TREE PROTECTION PLAN

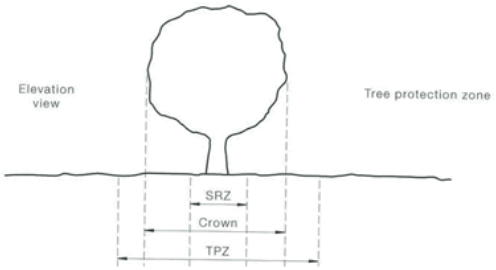
Mulch: 2, 2a, 36, 37, 43, 61.	**Tree Protection Fencing:** 1, 2, 2a, 3, 35, 36, 37, 43, 50, 53, 58, 61, 62.	**Tree Trunk Protection:** 5, 12, 34.	**AQF Level 5 arborist supervision** is required for all works carried out within the TPZs of the retained trees.

Plans Referenced: Basement 01, Lower Ground Floor and Upper Ground Floor prepared by DKO Architecture, dated 6th of February, 2024.

8. TREE MANAGEMENT SPECIFICATIONS

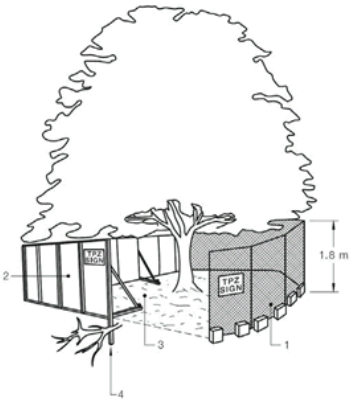
Tree Protection Zone (TPZ) Specifications

Tree protection fencing ensures construction does not encroach into a tree's TPZ. The Structural Root Zone (SRZ) of a tree is the area essential for tree stability. Works conducted within the SRZ may destabilise the tree and lead to potential failure.



Tree Protection Fencing: Fencing must not be removed or altered. Specifications for tree protection fencing must be as follows:

- Installed prior to development and certified by a project arborist.
- Fully enclosed around a tree's TPZ.
- 1.8-metre-high temporary chain wire mesh cyclone fencing.
- Signposted with 300mm x 450mm signage that reads "No Entry. Tree Protection Zone".
- Add mulch across the surface of the TPZ and water regularly.

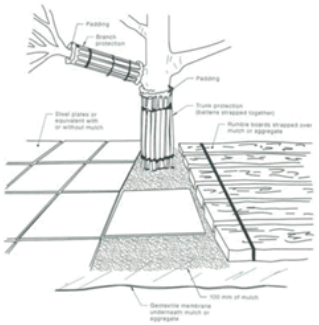


Specifications for tree protection fencing on slopes or uneven ground must be as follows:

- Star pickets spaced at 2 metre intervals with a minimum height of 1 metre.
- Connected by a continuous high-visibility barrier or hazard mesh.
- Alternative plywood or wooden paling fence panels.

Tree Trunk and Branch Protection: Specifications for tree trunk protection when fencing is impractical must be as follows:

- A layer of padding, geotextile fabric or similar wrapped around the trunk to a minimum height of 2 metres.
- 1.8 metre lengths of timbers aligned vertically and spaced at small gaps evenly around the trunk.
- Boards are to be strapped to trees, not nailed or screwed to the tree.



Prohibitions for Tree Protection Zones: The following activities shall **not** be carried out within any TPZ:

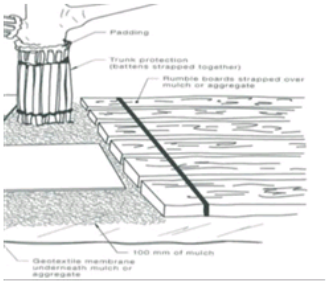
- Disposal of chemicals and liquids (including concrete and mortar slurry, solvents, paint, fuel or oil).
- Stockpiling, storage or mixing of materials.
- Refuelling, parking, storing, washing and repairing tools, equipment, machinery and vehicles.
- Disposal of building materials and waste.

The following activities shall **not** be carried out within any TPZ **unless** under the supervision of a project arborist:

- Increasing or decreasing soil levels (including cut and fill).
- Soil cultivation, excavation or trenching.
- Placing offices or sheds.
- Assembly of scaffolding or hoardings; and/or another act that may adversely affect the tree.

Root Protection Specifications: If temporary access for machinery is required within the TPZ, ground protection measures will be required to prevent root damage and soil compaction. Specifications for ground protection are as follows:

- Permeable membrane such as geotextile fabric.
- Layer of mulch or crushed rock (at minimum depth of 100mm).
- Or rumble boards strapped over mulch or aggregate.



CORRECT MULCH METHOD

Mulch Within TPZ: Maintain aged *Eucalyptus spp.* mulch around the retained trees for the duration of the development in accordance with Australian Standard® AS 4454-2003 – Compost, Soil Conditioners and Mulches.
Mulch should have at least 70% by mass of its particles, with a maximum size of greater than 16mm and spread 50-75mm deep to the extent of the dripline, (never exceed 100mm depth). Mulch should not have contact with a tree's trunk. Apply 200mm from the trunk, shaping a soil berm dish close to the root ball to facilitate establishment of watering.

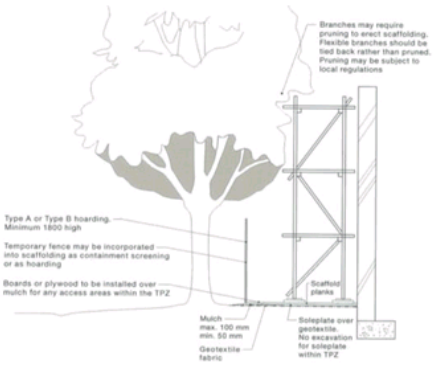
Watering Schedule: Maintain a watering schedule for retained trees at a rate of approximately 45 litres daily (Trees Impact: 2021).

Excavation Within TPZ's: Excavations shall be undertaken under the supervision of a project arborist, using tree-sensitive, non-destructive methods (e.g. manual excavation with hand tools, air-spade or hydro-vacuum machinery).

- No roots greater than 40mm in diameter are to be damaged, pruned or removed. All care shall be taken to preserve and avoid damaging roots. Excavations should not occur within a tree's SRZ.
- Exposed roots shall be protected from direct sunlight by covering with hessian or similar fabric and kept moist at all times.
- Hand excavation and root mapping shall be undertaken along excavation lines within the TPZ. Any conflicting roots greater than 40mm in diameter shall be pruned using clean, sharp secateurs or a pruning saw to ensure a clean cut that is free from tears.

Installing Underground Services Within TPZ: All services should be routed outside the TPZ.

- If underground services must be routed within the TPZ, they should be installed by directional drilling or in manually excavated trenches.
- The directional drilling boring methods, such as horizontal drilling (HDD) may be at least 600mm deep. The project arborist should assess the likely impacts of boring and bore pits on retained trees.
- Excavations for entry/exit pits must be located outside the TPZ.



9. GLOSSARY

Aerial inspection: Where a tree is climbed by an arborist to inspect the upper stem and crown for signs or symptoms of defects and disease.
Assets Protection Zone (APZ): A fuel-reduced area surrounding a built asset or structure.
Bracket fungus: The rigid fruiting body of some fungus species.
Branch collar: The ring of wood tissue, which forms around the base of a branch (near the branch attachment).
Cavity: A void, initiated by a wound within the trunk, branches or roots. These voids are referred to as hollows.
Canker: Fungal infections of the bark and cambium that can occur on all parts of the tree.
Co-dominant: Stems or branches equal in size and relative importance.
Crown: All the parts of a tree arising above the trunk where it terminates by its division forming branches e.g. the branches, leaves, flowers and fruit, or the total amount of foliage supported by branches.
Crown lifting: The removal of the lower branches of the tree.
Dead wood: Refers to any whole limb that no longer contains living tissues
Decay: Process of degradation of woody tissues by fungi or bacteria through decomposition of cellulose and lignin.
Deciduous: Describes trees and bushes that shed their leaves in the autumn (opposite to evergreen).
Dieback: Tree deterioration where the branches and leaves die.
Drip line: Where the canopy releases water shed from the foliage during precipitation.
DBH: Diameter at breast height, about 1.4 metres of trunk height.
Epicormic Shoots: These shoots often have a weak point of attachment. Epicormic growth/shoots are generally a survival mechanism, often indicating the presence of a current, or past stress event such as fire, pruning, drought, etc.
Flush cut: A cut that damages or removes the branch collar or removes the branch and stem tissue and is inconsistent with the branch attachment as indicated by the bark branch ridge.
Genus/species: Identified using its botanical name. Where the species name is not known, species (spp.) is used. The common name for trees may vary considerably in each area by geographical differences.
Height: Height has been estimated to +/- 2 metres.
Inclusion: The pattern of development at branch or stem junctions where bark is turned inward rather than pushed out. This fault is located at the point where the stems/branches meet.
Maturity: Tree age, assessed as over-mature (last 1/3 of life expectancy), mature (1/3 to 2/3 life expectancy) and semi-mature (less than 1/3 life expectancy).
Remedial (restorative) pruning: The removal of damaged or dead wood; or the trimming of diseased or infested branches. Trimming branches back to undamaged tissue in order to induce shoots, from which a new crown will be established.
Resistograph® testing: A resistograph® is a specialised machine that measures timber density by a drilling a 3mm diameter probe through the wood, simultaneously plotting the results on a graph at full scale.
Structural integrity: Describes the internal supporting timber (substantial to frail).
Structural Root Zone (SRZ): Refers to the radial distance in metres, measured from the centre of the tree stem, which defines the critical area required to maintain stability of the tree.
Targets: Are people, property, or activities that could be injured, damaged, or disrupted by a tree.
Tree Protection Zone (TPZ): Refers to the radius distance in metres, measured from the centre of the tree stem which defines the tree protection zone for a tree to be retained. This is generally the minimum distance from the centre of the tree trunk where protective fencing is to be installed to create an exclusion zone associated with construction works.
Vigour: Refers to the tree's health as exhibited by the crown density, leaf colour, presence of epicormic shoots, ability to withstand disease/invasion, and the degree of dieback.
Windthrow: Tree failure when a force exerted by wind against the foliage crown and trunk overcomes resistance to that force in the root plate.

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APPENDICES

Appendix A Visual Tree Assessment (VTA)

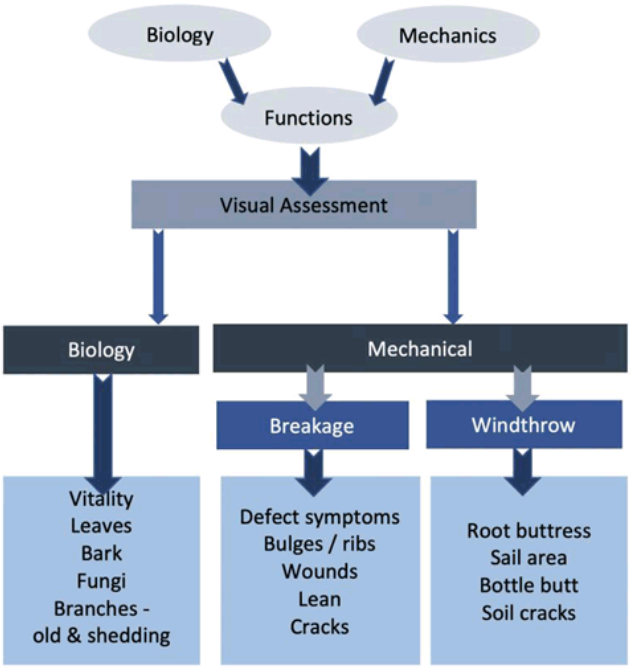

Diagram 1: *VTA Chart by Claus Mattheck (1994) The Body Language of Trees adapted*

Schedule 1: *Categories for VTA.*

Visual Tree Diagnostics			
1	Maturity: J - Juvenile; IM - Immature; SM - Semi-Mature; M - Mature		
Health & Vigour		**Condition of Tree**	
KEY		KEY	
		2	Good condition
		3	Good condition but poor development
		3b	Moderate condition
		3c	Poor condition
4	Dieback is more than 20%.		
4b	Epicormics		
5	Sparse foliage	5b	Unbalanced Canopy
		6	Physical Damage
7	Insect damage – foliage		
7b	Borers		
8	Fungal attack – pathogen		
		9	Cavity
10	Termite activity	10b	Inclusions
		11	Lean
12b	Dying	12	Heavily pruned
		13	Damaged roots
		13b	Encroachment
14	Parasitic vine present		
15	Damage from a climbing plant		
		16	Inclusions
17	Habitat tree		
18	Endangered species		

Appendix B Tree A-Z Categories

Schedule 2: *Tree A-Z Categories Field Sheet (version 10.04-U8C)*

Barrell (2019) Criteria for Assessing the Importance of Trees on Development Sites.

TreeAZ Categories Field Sheet (Version 10.04-USC)

CAUTION: TreeAZ assessments must be carried out by a competent person qualified and experienced in arboriculture. The following category descriptions are designed to be a brief field reference and are not intended to be self-explanatory. They must be read in conjunction with the most current explanations published at www.TreeAZ.com.

Category Z: Unimportant trees not worthy of being a material constraint

	Local policy exemptions: Trees that are unsuitable for legal protection for local policy reasons including size, proximity and species
Z1	Young or insignificant small trees, i.e. below the local size threshold for legal protection, etc
Z2	Too close to a building, i.e. exempt from legal protection because of proximity, etc
Z3	Species that cannot be protected for other reasons, i.e. scheduled noxious weeds, out of character in a setting of acknowledged importance, etc
	High risk of death or failure: Trees that are likely to be removed within 10 years because of acute health issues or severe structural failure
Z4	Dead, dying, diseased or declining
Z5	Severe damage and/or structural defects where a high risk of failure cannot be satisfactorily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, overgrown and vulnerable to adverse weather conditions, etc
Z6	Instability, i.e. poor anchorage, increased exposure, etc
	Excessive nuisance: Trees that are likely to be removed within 10 years because of unacceptable impact on people
Z7	Excessive, severe and intolerable inconvenience to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. dominance, debris, interference, etc
Z8	Excessive, severe and intolerable damage to property to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. severe structural damage to surfacing and buildings, etc
	Good management: Trees that are likely to be removed within 10 years through responsible management of the tree population
Z9	Severe damage and/or structural defects where a high risk of failure can be temporarily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, vulnerable to adverse weather conditions, etc
Z10	Poor condition or location with a low potential for recovery or improvement, i.e. dominated by adjacent trees or buildings, poor architectural framework, etc
Z11	Removal would benefit better adjacent trees, i.e. relieve physical interference, suppression, etc
Z12	Unacceptably expensive to retain, i.e. severe defects requiring excessive levels of maintenance, etc

NOTE: Z trees with a high risk of death/failure (Z4, Z5 & Z6) or causing severe inconvenience (Z7 & Z8) at the time of assessment and need an urgent risk assessment can be designated as ZZ. ZZ trees are likely to be unsuitable for retention and at the bottom of the categorization hierarchy. In contrast, although Z trees are not worthy of influencing new designs, urgent removal is not essential and they could be retained in the short term, if appropriate.

Category A: Important trees suitable for retention for more than 10 years and worthy of being a material constraint

A1	No significant defects and could be retained with minimal remedial care
A2	Minor defects that could be addressed by remedial care and/or work to adjacent trees
A3	Special significance for historical, cultural, commemorative or rarity reasons that would warrant extraordinary efforts to retain for more than 10 years
A4	Trees that may be worthy of legal protection for ecological reasons (Advisory requiring specialist assessment)

NOTE: Category A1 trees that are already large and exceptional, or have the potential to become so with minimal maintenance, can be designated as AA at the discretion of the assessor. Although all A and AA trees are sufficiently important to be material constraints, AA trees are at the top of the categorization hierarchy and should be given the most weight in any selection process.

Appendix C Tree Useful Life Expectancy – (TULE)

Schedule 3: *Adapted with permission Jeremy Barrell (SULE) 2014 for TCAA consulting arborists.*

	1 LONG TULE	2 MEDIUM TULE	3 SHORT TULE	4 REMOVE	5 NO POTENTIAL FOR RETENTION	6 SMALL, YOUNG OR REGULARLY CLIPPED
	Trees that appear to be retainable for more than 40 years with a low level of risk.*	Trees that appear to be retainable for 15-40 years with a low to medium level of risk.*	Trees that appear to be retainable for 5-15 years with a medium to high level of risk.*	Trees that should be removed within the next 5 years with a high to very high level of risk.*	Trees that should be removed immediately with a very high to extreme level of risk.*	Trees than can be easily transplanted or replaced.
A	Structurally sound trees located in positions that can accommodate future growth.	Trees that may only live for between 15 and 40 more years.	Trees that may only live for between 5 and 15 more years.	Dead, dying or declining trees through disease or inhospitable conditions.	Dead, dying or declining trees diseased or inhospitable conditions.	Small trees less than 5 metres in height.
B	Trees that could be made suitable for retention in the long term by intervention works.	Trees that may live for more than 40 years, but would need to be removed for safety or nuisance reasons.	Trees that may live for more than 15 years, but would need to be removed for safety or nuisance reasons.	Dangerous trees through instability or recent loss of adjacent trees.	Dangerous trees through instability or recent loss of adjacent trees.	Young trees less than 15 years old but over 5 metres in height.
C	Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long-term retention.	Trees that may live for more than 40 years, but should be removed to prevent interference with more suitable individuals or to provide space for new planting.	Trees that may live for more than 15 years, but should be removed to prevent interference with more suitable individuals or to provide space for new planting.	Dangerous trees through structural defects including cavities, decay, included bark, wounds or poor form.	Dangerous trees through structural defects including cavities, decay, included bark, wounds or poor form.	Trees that have been regularly pruned to artificially control growth.
D		Trees that could be made suitable for retention in the medium term by intervention works.	Trees that require substantial intervention works and are only suitable for retention in the short term.	Damaged trees that are clearly not safe to retain.	Damaged trees that are clearly not safe to retain and must be removed immediately.	
E				Trees that may live for more than 5 years, but should be removed to prevent interference with more suitable individuals or to provide space for new planting.	High toxicity/allergen trees, asthmatic and poisonous trees that must be removed immediately.	
F				Trees that may cause damage to existing structures within 5 years.	OTHER, with legitimate explanation to be removed immediately.	
G				Trees that will become dangerous after removal of other trees for reasons given in 4A to 4F.		

INSPECTION FREQUENCY					
Every 1-5 years by a competent inspector, or event monitored.	Every 1-5 years by a competent inspector, or event monitored.	Every 1-3 years by a competent inspector, or event monitored.	Annually by a competent inspector, or event monitored.	Every 1-7 days by a competent inspector and event monitored.	Bi-annually by a competent inspector.

** For sites with higher occupation.*

Appendix D Landscape Significance Rating

Schedule 4: *Heritage, Ecological and Amenity Significance. Source: Morton, A (2006) Criteria for Assessment of Landscape Significance.*

RATING	HERITAGE VALUE	ECOLOGICAL VALUE	AMENITY VALUE
SIGNIFICANT	The subject tree is listed as a Heritage Item under the Local Environment Plan (LEP) with a local, state, or national level of significance or is listed on Council's Significant Tree Register.	The subject tree is scheduled as a Threatened Species as defined under the Threatened Species Conservation Act 1995 (NSW) or the Environmental Protection and Biodiversity Conservation Act 1999.	The subject tree has a very large live crown size exceeding 300m² with normal to dense foliage cover, is in a visually prominent position in the landscape, exhibits very good form and habit typical of the species.
	The subject tree forms part of the curtilage of a Heritage Item (building/structure/artefact as defined under the LEP) and has a known or documented association with that item.	The tree is a locally indigenous species, representative of the original vegetation of the area and is known as an important food, shelter, or nesting tree for endangered or threatened fauna species.	The subject tree makes a significant contribution to the amenity and visual character of the area by creating a sense of place or creating a sense of identity.
	The subject tree is a Commemorative Planting having been planted by an important historical person (s) or to commemorate an important historical event.	The subject tree is a remnant tree, being a tree in existence prior to development of the area.	The tree is visually prominent in view from surrounding areas, being a landmark or visible from a considerable distance.
VERY HIGH	The tree has a strong historical association with a heritage item (building/structure/artefact/garden etc..) within or adjacent the property and/or exemplifies a particular era or style of landscape design associated with the original development of the site.	The tree is a locally indigenous species, representative of the original vegetation of the area and is a dominant or associated canopy species of an Endangered Ecological Community (EEC) formerly occurring in the area occupied by the site.	The subject tree has a very large live crown size exceeding 200m², a crown density exceeding 70% (normal-dense), is a very good representative of the species in terms of its form and branching habit or is aesthetically distinctive and makes a positive contribution to the visual character and the amenity of the area.
HIGH	The tree has a suspected historical association with a heritage item or landscape supported by anecdotal or visual evidence.	The tree is a locally indigenous species and representative of the original vegetation of the area and the tree is located within a defined Vegetation Link/Wildlife Corridor or has known wildlife habitat value.	The subject tree has a large live crown size exceeding 100m²; The tree is a good representative of the species in terms of its form and branching habit with minor deviations from normal (e.g. crown distortion/suppression) with a crown density of at least 70% (normal); The subject tree is visible from the street and surrounding properties and makes a positive contribution to the visual character and the amenity of the area.
MODERATE	The tree has no known or suspected historical association, but does not detract or diminish the value of the item and is sympathetic to the original era of planting.	The subject tree is a non-local native or exotic species that is protected under the provisions of this DCP.	The subject tree has a medium live crown size exceeding 40m²; The tree is a fair representative of the species, exhibiting moderate deviations from typical form (distortion/suppression etc.) with a crown density of more than 50% (thinning to normal); and The tree is visible from surrounding properties, but is not visually prominent – view may be partially obscured by other vegetation or built forms. The tree makes a fair contribution to the visual character and amenity of the area.
LOW	The subject tree detracts from heritage values or diminishes the value of a heritage item.	The subject tree is scheduled as exempt (not protected) under the provisions of this DCP due to its species, nuisance, or position relative to building or other structures.	The subject tree has a small live crown size of less than 40m² and can be replaced within the short term (5-10 years) with new tree planting.
VERY LOW	The subject tree is causing significant damage to a heritage item.	The subject tree is listed as an Environment Weed Species in the relevant Local Government Area, being invasive, or is a known nuisance species.	The subject tree is not visible from surrounding properties (visibility obscured) and makes a negligible contribution or has a negative impact on the amenity and visual character of the area. The tree is a poor representative of the species, showing significant deviations from the typical form and branching habit with a crown density of less than 50% (sparse).
INSIGNIFICANT	The tree is completely dead and has no visible habitat value.	The tree is a declared noxious weed under the Biosecurity Act 2015 (NSW) within the relevant Local Government Area.	The tree is completely dead and presents a potential hazard.

Appendix E Retention Value Rating

Schedule 5: *Determining the Tree Retention Value Morton, A (2011).*

Evaluating Sustainability and Landscape Significance to Determine Retention Value	
Retention Value	Criteria and Categories
HIGH	These trees are worthy of preservation. As such, careful consideration should be given to their retention as a priority. Proposed site design and placement of buildings and infrastructure should consider the Tree Protection Zones (TPZ), as discussed in the following section, to minimise any adverse impact. In addition to TPZs, the extent of the canopy (canopy dripline) should also be considered, particularly in relation to a high-rise development. Significant pruning of the trees to accommodate the building envelope or temporary scaffolding is generally not acceptable.
MODERATE	The retention of these trees is desirable. These trees should be retained as part of any proposed development, if possible; however, these trees are less critical for retention. If these trees must be removed, replacement planting should be considered in accordance with Council's Tree Replacement Policy to compensate for loss of amenity.
LOW	These trees are not considered to be worthy of any special measures to ensure their preservation, due to current health, condition, or suitability. They do not have any special ecological, heritage or amenity value, or these values are substantially diminished due to their SULE. These trees should not be considered as a constraint to the future development of the site.
VERY LOW	These trees are potentially hazardous or very poor specimens, or may be environmental or noxious weeds. The removal of these trees is therefore recommended regardless of the implications of any proposed development.

Appendix F Tree Planting Specifications

Tree planting specifications are in accordance with NATSPEC Specification for Trees, Ross Clark (2003) and Australian Standard® AS 2303-2018 – Tree Stock for Landscape Use.

BEFORE PLANTING

- Don't plant trees too close to buildings, in-ground pools, avoid planting under power lines and over drainage pipes or near other large trees.
- A consider the effect on neighbouring properties (i.e. shade, loss of views, impact on foundations, fences and services).
- Plant deciduous trees if you want in summer shade and winter sun. Consider shadows cast from evergreen trees.
- Use locally native to attract native fauna and to reduce watering required.

BASIC TREE PLANTING

1. Dig the hole at least twice as wide as the pot size.
2. Loosen the soil at the sides of the hole. Fill hole with water and allow to drain away.
3. Place the loosened root ball in the hole. Fill back soil. The top of the root ball should be level with the surrounding soil.
4. Water the plant deeply after planting, once a week for the first two months.

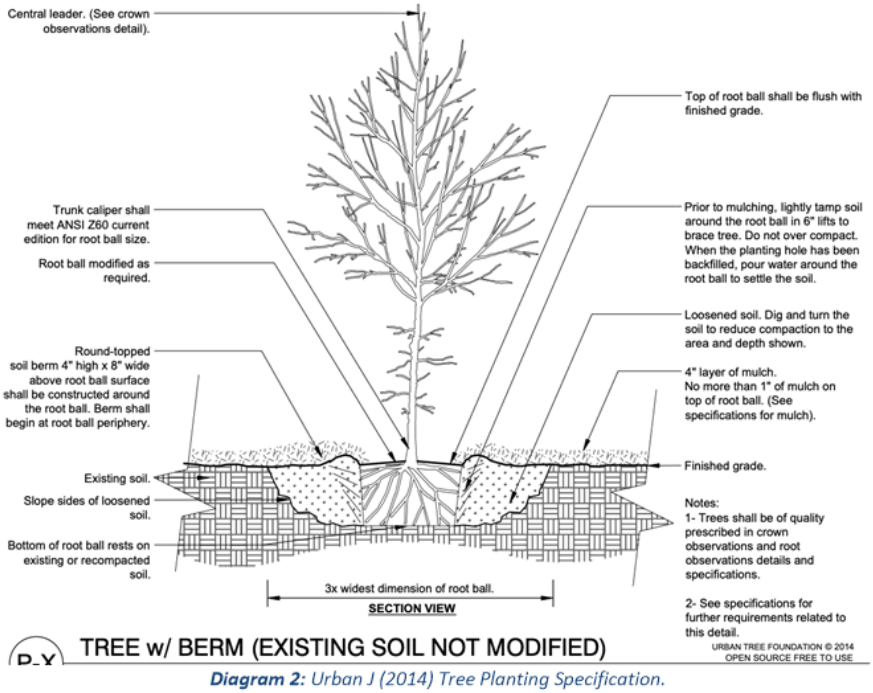

Diagram 2: *Urban J (2014) Tree Planting Specification.*

Schedule 6: *Watering Frequency.*

	Watering frequency for 45L pot		
Time of year	*1st month*	*2nd and 3rd month*	*4th to 6th month*
Sept-Feb.	4x week	3 x week	2 x week
Mar-May	3 x week	2 x week	1 x week
Jun-August	2 x week	1 x week	1x fortnight

Appendix G Replenishment of Native Trees Species

Schedule 7: *Tree Species and Sizes.*

Botanical Name	Common Name	Height (m) at maturity	Crown Spread (m)
Leptospermum petersonii	Lemon-Scented Tea Tree	5	6
Agonis flexuosa	Willow Myrtle	7	6
Elaeocarpus eumundi	Quandong	8	4
Corymbia ficifolia	Red Flowering Gum	8	5
Syzygium luehmannii	Riberry	8	5
Waterhousea floribunda	Weeping Lilly Pilly	8	5
Acacia implexa	Hickory Wattle	8	6
Hymenosporum flavum	Native Frangipani	8	6
Tristaniopsis laurina	Water Gum	9	5
Corymbia eximia	Yellow Bloodwood	10	7
Callistemon viminalis	Weeping Bottlebrush	10	8
Melaleuca linariifolia	Narrow-Leaved Paperbark	10	8
Cupaniopsis anacardioides	Tuckeroo	10	10
Callistemon salignus	Willow Bottlebrush	12	6
Eucalyptus cinerea	Argyle Apple	12	7
Elaeocarpus reticulatus	Blueberry Ash	15	8
Flindersia australis	Australian Teak	15	10
Brachychiton populneus	Kurrajong Tree	15	12
Backhousia citriodora	Lemon Myrtle	18	6
Angophora costata	Sydney Red Gum	20	10
Lophostemon confertus	Brush Box	20	16

MULCH: Adding a layer of mulch to reach 75mm, encourages water retention and microbes, that will break down and incorporate organic matter into the soil. Organic mulch will reduce weeds and root development.

CORRECT MULCH METHOD

- Add at least 70% by mass of its particles with a maximum size of greater than 16 mm in accordance with Australian Standard® AS 4454-2003 – Compost, Soil Conditioners and Mulches. Apply 200mm from trunk and shaping a soil berm dish close to the root ball to facilitate establishment of watering.
- The TPZ of retained trees should be maintained with a 75mm depth of organic, certified, coarse Eucalyptus mulch.
- Mulch should be retained at 5075mm depth and never exceed 100mm in depth.
- Do not allowed mulch to contact the tree trunk. Retain a mulch free gap of not less than 75mm and preferably 200mm clear from the base of the tree trunk.

Disclaimer

McArdle Arboricultural Consultancy Pty Ltd does not assume responsibility for liability associated with the tree on/or adjacent to this project site, the future demise and/or any damage which may result therefrom. They take care to obtain all information from reliable sources. All data has been verified insofar as possible; however, the consultant can neither guarantee nor be responsible for the accuracy of information provided by others.

McArdle Arboricultural Consultancy Pty Ltd cannot be held responsible for any consequences as result of work carried out outside specifications, not in compliance with Australian Standard® or by inappropriately qualified staff. If further investigations such as, aerial, drill and root test are recommended, the report shall not be considered final until all investigations have been completed, as further defects may be found.

STATEMENT OF LIMITATIONS

McArdle Arboricultural Consultancy Pty Ltd makes every effort to accurately identify current tree health and hazards. Results may or may not correlate to actual tree structural integrity. There are many factors that may contribute to limb or total tree failure. Not all these symptoms are visible. There can be hidden defects that may result in a failure even though it would seem that other, more obvious defects would be the likely cause of failure. All standing trees have an element of unpredictable risk.

The inspection was limited to a visual ground examination of the tree, without aerial inspections and below ground excavations. The assessments are limited and do not include specialised analysis. No internal diagnostics, aerial inspection and pathology test were conducted. Sketches, diagrams, graphs, and photographs in this report, being intended as visual aids, are not necessarily to scale. No part of this report is to be reproduced without written permission from the author.

Consulting Arborist
Jim McArdle

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Quantified Tree Risk Assessment (QTRA) Registered Member
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DESIGN & CONSTRUCTION EXCELLENCE

Stormwater Management Report

9 Albert & 31 O'Connell Street, North Parramatta

Prepared For
Ceerose Pty Ltd

Document Information

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Issue A February 2024

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Disclaimer

The advice and information contained within this report relies on the quality of the records and other data provided by the Client, site inspections along with the time and budgetary constraints imposed.

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1 INTRODUCTION

1.1 Overview

Telford Consulting has been commissioned to prepare this Stormwater Management Report for the proposed development at 9 Albert & 31 O'Connell Street, North Parramatta.

This report will form part of the Planning Proposal which will be submitted to City of Parramatta Council as supporting documentation for the Planning approval process.

It is proposed to construct a Mixed Used Development and the associated works which will cover the whole site. The total site area is approximately 8910m^2.

1.2 Available Information

Architectural drawings prepared by DKO Architecture

1.3 The Proposal

The proposed development site is located at 9 Albert & 31 O'Connell Street, North Parramatta. The location of the site is shown in Figure 1.3.1 Locality Map below.

Figure 1.3.1: Locality Map

1.4 Scope of this report

The aim of this report is to provide a Concept Water Management plan and calculations outlining methods of containing stormwater run-off at the proposed site and disposing of it during and after a storm event to a legal point of discharge ensuring no adverse flooding or nuisance impacts caused by the development.

This report is compiled in co-ordination with the stormwater quality objectives, addressing the need for water quality control measures. The stormwater treatment train is designed using MUSIC modelling tool to achieve pollution reduction targets which identified in City of Parramatta Council DCP.

2 SITE CHARACTERISTICS

2.1 Site Description

The subject site comprises 2 existing lots known as 9 Albert Street, North Parramatta legally described as Lot 1 DP 1143431, & 31 O'Connell Street, North Parramatta legally described as Lot 1 DP 998240.

2.2 Existing Land Use

The site is currently vacant, with demolition of existing structures carried out in 2022 (DA/1047/2017)

3 STORMWATER QUANTITY ASSESSMENT

City of Parramatta Council's DCP states that all developments are required to demonstrate that stormwater runoff from the site is collected and conveyed to a legal point of discharge without adversely impacting adjoining or downstream properties in accordance with its guidelines and all systems shall be designed with consideration to the major/minor system design principle in Australian Rainfall & Runoff allowing for overflows of the piped system and flows in excess of the piped system capacity to be discharged in a controlled manner in the same direction as the pipe to a legal point of discharge.

Given that the site falls under Commercial developments, On Site Detention is required.

The point of discharge for the proposed development is an existing stormwater gully pit at the intersection of Fleet Street and Fennell Street. The site will discharge into a proposed new butterfly pit in front of 2 Fleet Street, North Parramatta which will connect to the existing stormwater gully pit.

The OSD is designed on the basis that the total discharge of stormwater from the site is 10% less than that from the site before it was developed (in a natural state).

To mitigate the increased post-development runoff, it has been proposed to install one (1) underground OSD tank prior to the discharge point.

DRAINS ILSAX model was used to analyse the detention requirements for a range of storm events. The following table details the preliminary detention storage requirements for the proposed OSD tank.

Table 3.1 – Preliminary Detention Basin Properties

Name	Volume (m^3)	Area (m^2)	Average Depth (m)
OSD Tank	121	39.80	3.04

Table below summarises the peak discharge from the site in the pre-development and post-development scenario at all Outlets.

Table 3.2 – Summary of peak discharge

Outlet	Scenario	STORM EVENT (ARI)				
		5YR	10YR	20YR	50YR	100YR
Site	Pre-dev	155	197	239	296	347
	Post-dev	138	159	215	262	296

The table indicates that with the proposed detention basin, the development will successfully attenuate all post-development peak discharges from the proposed development, for all investigated return periods.
In addition, the total discharge of stormwater from the site is 10% less than that from the site before it was developed (in a natural state).

Refer to the Stormwater Drainage Plans are attached in Appendix A for further details.

4 FLOOD RISK

In reference to City of Parramatta Council Flood Smart Service, the subject site is not flood affected up to and including the PMF storm event.

Figure 2 below shows the flood risk map relative to the subject site extracted from City of Parramatta Flood Warning Areas.

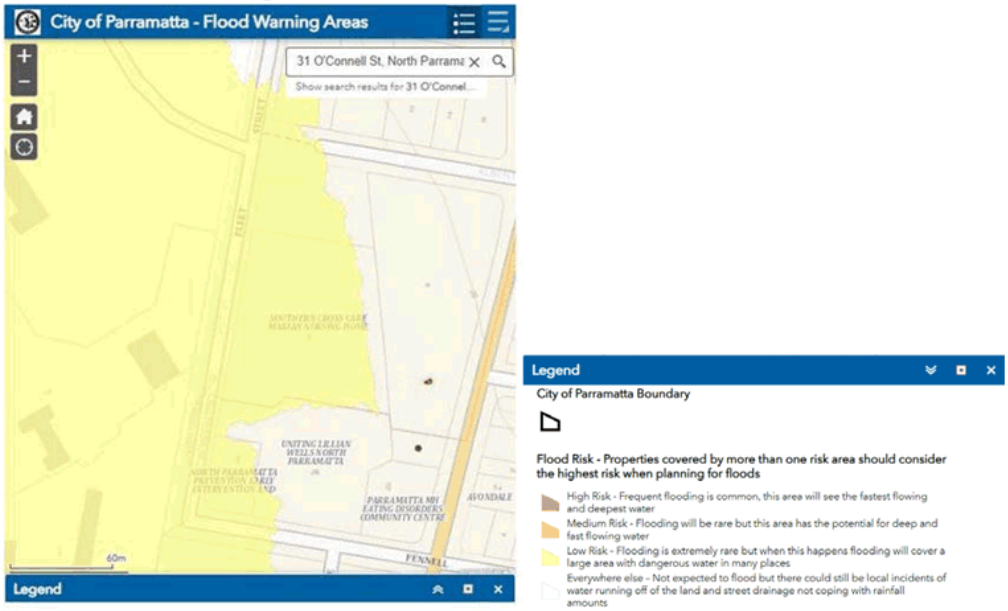


Figure 4.1: Flood Risk Map

The proposed development will not impose any additional risks to the occupants or neighboring properties as it will cause no loss in flood storage or water diversion up to the PMF storm event.

The proposed development complies with Council's requirements and therefore a flood impact and risk assessment report are not deemed to be required.

5 STORMWATER QUALITY ASSESSMENT

5.1 Aims and Objectives

City of Parramatta Council's DCP states that all developments will be required to implement the principles of Water Sensitive Urban Design (WSUD).

Given that the site falls under Commercial developments, a WSUD strategy is required to ensure that water quality being discharged from the site is achieved to a level that will satisfy Council's performance target reduction loads.

The stormwater Treatment Targets for Development are listed below.

Table 5.1.1 – Stormwater Treatment Targets.

Pollutant	% Post Development Average Annual Load Reduction
Gross Pollutants	90%
Total Suspended Solids	85%
Total Phosphorus	60%
Total Nitrogen	45%

5.2 Site Analysis and Design Strategy

The proposed development offers the opportunity to provide stormwater quality treatment where none exists at present.

The proposed solution is to use bio-retention basins and rainwater tanks (or approved equivalent) to treat and remove nutrient pollutants and gross from the stormwater drainage cycle from roof, hard surface and landscape.

Bio-retention systems are vegetated areas where stormwater is passed through densely planted filter media (loamy sand) allowing the plants to absorb the collected and stored nutrients. Bio retention basins utilize temporary ponding above the vegetated surface to increase the volume of stored water for treatment. Bio-retention systems can take a number of forms but all have common features including the extended detention depth above the media surface, the filter media and a low level drainage media and subsoil system. These are shown in the figure below.

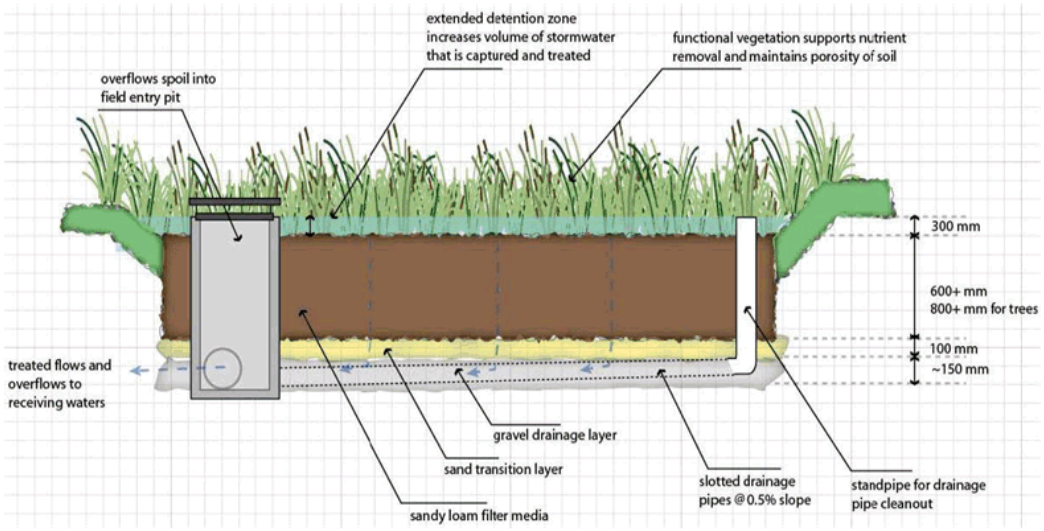
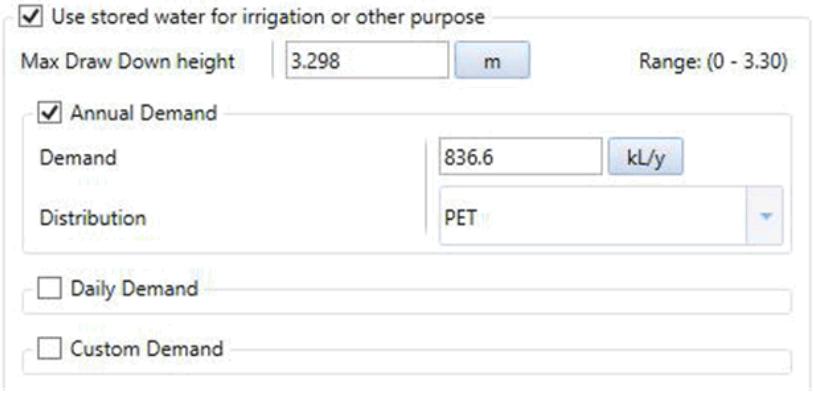


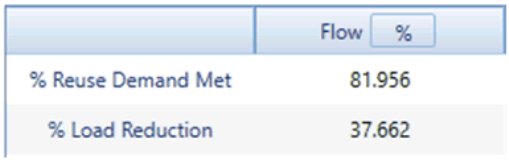
Figure 5.2.1: Typical Section of a generic Bio-Detention system (Source: Water by Design)

A 25m^2 bio-retention system has been proposed to be installed for the water quality treatment. MUSICx software was used to assess pollutant generation and the performance of stormwater treatment measures for the proposed development. Figure below presents the MUSIC model and results.

Water conservation measures are also applied to the development. A 59.2m^3 rainwater tank is proposed to treat the entirety of the roof runoff to be re-used for irrigation. For irrigation of landscaped areas, we allowed a value of 0.2 kL/year/m2 as PET-Rain for sprinkler systems.



Screenshot above showing the rainwater tank inputs into the music model.



	Flow %
% Reuse Demand Met	81.956
% Load Reduction	37.662

Screenshot above showing the rainwater tank node water balance and the achieved re-use target.

6 MUSIC MODELLING

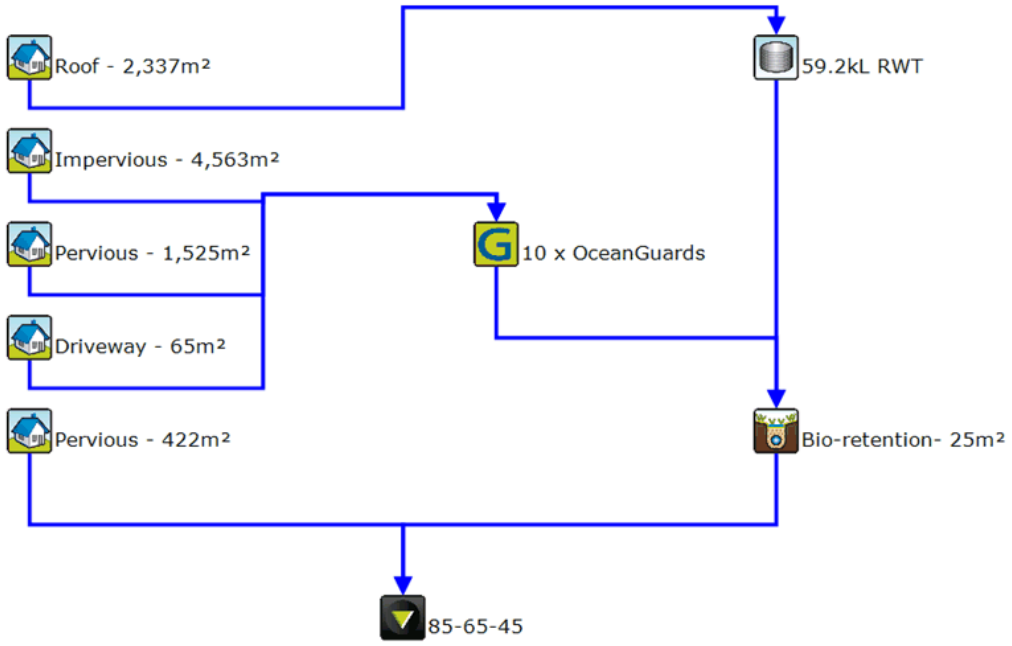
The water quality model adopted for this project is the MUSICX.

MUSIC can model a wide range of treatment devices to identify the best way to capture and reuse stormwater runoff, remove its contaminants, as well as reduce runoff frequency, to achieve WSUD and integrated water cycle management (IWCM) goals.

The MUSIC model was generated using the rainfall data and Stormfilter nodes prepared by Ocean Protect.

Catchment characteristics were defined using a combination of catchments with varying imperviousness ratios to replicate the catchment for the development condition.

Figure below presents the MUSIC model and results.



	Sources	Residual Load	% Reduction
Flow (ML/yr)	5.789	5.043	12.88
Total Suspended Solids (kg/yr)	850.6	98.46	88.43
Total Phosphorus (kg/yr)	1.92	0.6556	65.85
Total Nitrogen (kg/yr)	15.3	7.609	50.28
Gross Pollutants (kg/yr)	143	0	100

Figure 6.1: music model and results

The MUSIC model layout is shown in Appendix A of this report.

7 CONCLUSIONS

This proposed Site Based Stormwater Management Plan has been prepared for the proposed Mixed Used Development at 9 Albert & 31 O'Connell Street, North Parramatta. This report has demonstrated that the site will be able to manage site-based stormwater quantity and quality requirements for the design storms up to and including the 1% AEP event.

The proposed site-based stormwater management measures are as below:

The Lawful Point of Discharge has been maintained for the proposed development in the location where the natural pre development overland flow from the site discharges.

An underground detention tank will provide non-worsening of post-development discharge from the proposed development by reducing the total discharge of stormwater from the site by 10% less than that from the site before it was developped.

A bio-retention system will be incorporated to provide stormwater quality treatment for the runoff from the proposed development.

A rainwater tank will be incorporated to meet 80% irrigation demands.

The conclusion of this site-based stormwater management plan is that by implementing the proposed stormwater quantity and quality management measures, the proposed development will ensure no worsening effects downstream of the proposed development and conforms to best engineering practices.

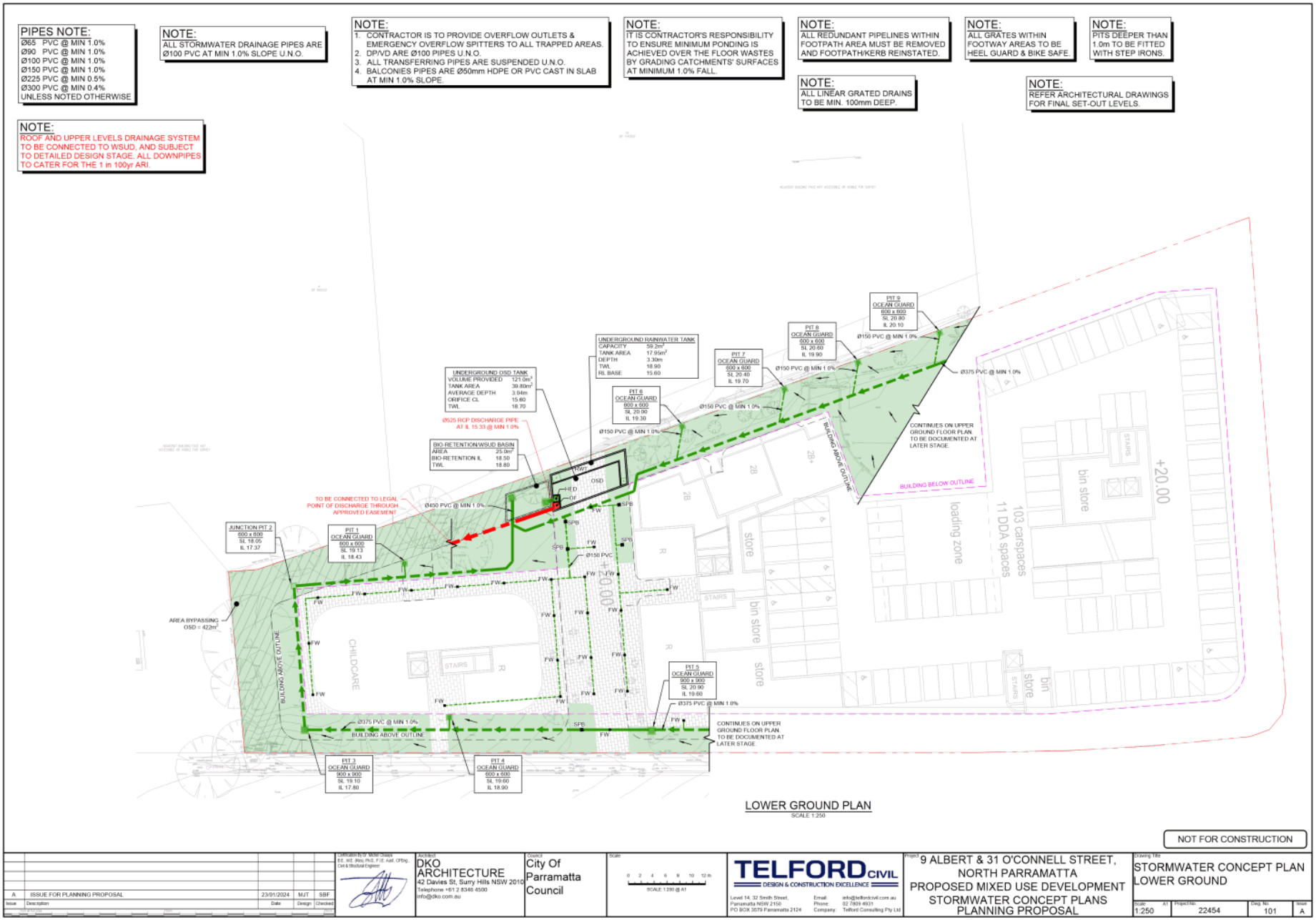
8 References

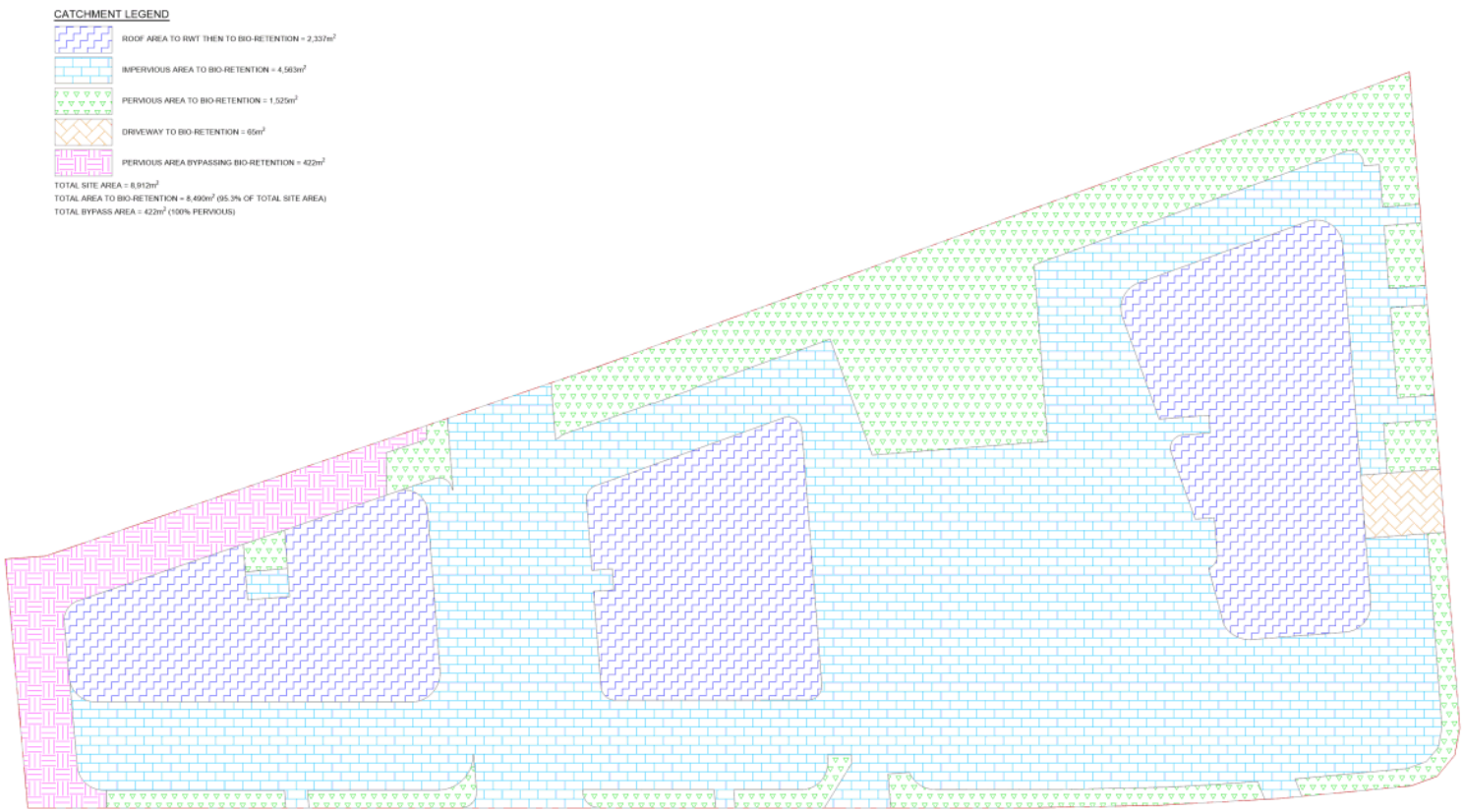
1- Parramatta Development Control Plan 2011

2- Development Engineering Design Guidelines.

APPENDIX A

Stormwater Plans


PIPES NOTE:
Ø65 PVC @ MIN 1.0%
Ø90 PVC @ MIN 1.0%
Ø100 PVC @ MIN 1.0%
Ø150 PVC @ MIN 1.0%
Ø225 PVC @ MIN 0.5%
Ø300 PVC @ MIN 0.4%
UNLESS NOTED OTHERWISE
NOTE:
ALL STORMWATER DRAINAGE PIPES ARE Ø100 PVC AT MIN 1.0% SLOPE U.N.O.
NOTE:
1. CONTRACTOR IS TO PROVIDE OVERFLOW OUTLETS & EMERGENCY OVERFLOW SPITTERS TO ALL TRAPPED AREAS.
2. DP/VD ARE Ø100 PIPES U.N.O.
3. ALL TRANSFERRING PIPES ARE SUSPENDED U.N.O.
4. BALCONIES PIPES ARE Ø50mm HDPE OR PVC CAST IN SLAB AT MIN 1.0% SLOPE.
NOTE:
IT IS CONTRACTOR'S RESPONSIBILITY TO ENSURE MINIMUM PONDING IS ACHIEVED OVER THE FLOOR WASTES BY GRADING CATCHMENTS' SURFACES AT MINIMUM 1.0% FALL.
NOTE:
ALL REDUNDANT PIPELINES WITHIN FOOTPATH AREA MUST BE REMOVED AND FOOTPATH/KERB REINSTATED.
NOTE:
ALL GRATES WITHIN FOOTWAY AREAS TO BE HEEL GUARD & BIKE SAFE.
NOTE:
PITS DEEPER THAN 1.0m TO BE FITTED WITH STEP IRONS.
NOTE:
ALL LINEAR GRATED DRAINS TO BE MIN. 100mm DEEP.
NOTE:
REFER ARCHITECTURAL DRAWINGS FOR FINAL SET-OUT LEVELS.
NOTE:
ROOF AND UPPER LEVELS DRAINAGE SYSTEM TO BE CONNECTED TO WSUD, AND SUBJECT TO DETAILED DESIGN STAGE. ALL DOWNPIPES TO CATER FOR THE 1 in 100yr ARI.
UNDERGROUND OSD TANK
VOLUME PROVIDED 121.0m³
TANK AREA 39.80m²
AVERAGE DEPTH 3.04m
ORIFICE CL 15.60
TWL 18.70
UNDERGROUND RAINWATER TANK
CAPACITY 59.2m³
TANK AREA 17.95m²
DEPTH 3.30m
TWL 18.90
RL BASE 15.60
BIO-RETENTION/WSUD BASIN
AREA 25.0m²
BIO-RETENTION IL 18.50
TWL 18.80
Ø525 RCP DISCHARGE PIPE AT IL 15.33 @ MIN 1.0%
TO BE CONNECTED TO LEGAL POINT OF DISCHARGE THROUGH APPROVED EASEMENT
Ø450 PVC @ MIN 1.0%
JUNCTION PIT 2
600 x 600
SL 18.05
IL 17.37
PIT 1
OCEAN GUARD
600 x 600
SL 19.13
IL 18.43
PIT 2
OCEAN GUARD
600 x 600
SL 20.00
IL 19.30
PIT 6
OCEAN GUARD
600 x 600
SL 20.00
IL 19.30
PIT 7
OCEAN GUARD
600 x 600
SL 20.40
IL 19.70
PIT 8
OCEAN GUARD
600 x 600
SL 20.60
IL 19.90
PIT 9
OCEAN GUARD
600 x 600
SL 20.80
IL 20.10
PIT 5
OCEAN GUARD
900 x 900
SL 20.00
IL 19.60
PIT 3
OCEAN GUARD
900 x 900
SL 19.10
IL 17.80
PIT 4
OCEAN GUARD
600 x 600
SL 19.60
IL 18.90
Ø150 PVC @ MIN 1.0%
Ø375 PVC @ MIN 1.0%
Ø150 PVC
AREA BYPASSING OSD = 422m²
BUILDING ABOVE OUTLINE
BUILDING BELOW OUTLINE
CONTINUES ON UPPER GROUND FLOOR PLAN TO BE DOCUMENTED AT LATER STAGE.
CHILDCARE
STAIRS
store
bin store
loading zone
103 carspaces
11 DDA spaces
+20.00
+19.00
LOWER GROUND PLAN
SCALE 1:250
NOT FOR CONSTRUCTION
A ISSUE FOR PLANNING PROPOSAL 23/01/2024 MJT SBF
DKO ARCHITECTURE
42 Davies St, Surry Hills NSW 2010
Telephone +61 2 8346 4500
info@dko.com.au
City Of Parramatta Council
SCALE 1:250 @ A1
TELFORD CIVIL
DESIGN & CONSTRUCTION EXCELLENCE
Level 14, 32 Smith Street, Parramatta NSW 2150
PO BOX 3579 Parramatta 2124
9 ALBERT & 31 O'CONNELL STREET, NORTH PARRAMATTA
PROPOSED MIXED USE DEVELOPMENT
STORMWATER CONCEPT PLANS
PLANNING PROPOSAL
STORMWATER CONCEPT PLAN
LOWER GROUND
1:250
22454
101
A



CATCHMENT PLAN
SCALE 1:250

NOT FOR CONSTRUCTION

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Project
9 ALBERT & 31 O'CONNELL STREET, NORTH PARRAMATTA
PROPOSED MIXED USE DEVELOPMENT
STORMWATER CONCEPT PLANS
PLANNING PROPOSAL

Drawing Title
WSUD CATCHMENT PLAN

Scale A1	Project No.	Dwg. No.	Issue
As Shown	22454	102	A

9 Albert & 31 O'Connell St
Parramatta North
New South Wales

Retail needs assessment & impact test

PREPARED FOR **Peterose Pty Ltd**

February 2024

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Executive summary

Regional and local context

- The subject site is located at 9 Albert Street & 31 O'Connell Street, North Parramatta, approximately 20 km west of the Sydney Central Business District (CBD) and within the Parramatta Local Government Area (LGA).
- An independent analysis of potential retail uses is required to support a future planning proposal.

Trade area population

- The trade area population is estimated at 1,770 at mid-2021, and is forecast to reach 3,570 people by 2036, reflecting average annual growth of 1.6% per annum to 2026, 9.5% from 2026 to 2031, and 3.4% from 2031 to 2036.

Socio-demographic profile

- The trade area population is generally characterised by slightly younger, overseas born families.

Retail expenditure

- Total retail expenditure per household, estimated at $31,745 per annum, is 28.4% below the Greater Sydney average. Within this, spend on food and non-food are 24.2% and 34.2% below the respective averages.
- Within the food category, spend per household on packaged liquor is 34.2% below the Greater Sydney average, and spend on fresh food and food catering are 28.4% and 15.1% below the Greater Sydney averages, respectively.
- Within the non-food retail categories (i.e. generally considered discretionary retail), spend on apparel, household goods, leisure and retail services are 34.6%, 31.5%, 33.6% and 33.8% below benchmark, respectively.

Retail floorspace analysis

- Estimated retail floorspace demand by residents in the trade area is forecast to increase from 4,110 sq.m in 2024 to around 7,200 sq.m in 2036.
- **FLG** – Typically 40 – 70% of this category is retained by a supermarket-based retail centre. Given the lack of major supermarket at the subject site we assume a share of expenditure that a small format, local supermarket/grocer could retain, estimated at 9.7% of the trade area. This equates to an estimated 192 sq.m of floorspace supportable by 2031.
- **Food catering** – Café/takeaway uses are assumed, with share of expenditure estimated at 12.8%. This equates to 192 sq.m of floorspace supportable by 2031.

- **Apparel** – Typically retailers in this category are more successful in larger, centralised centres and can struggle to maintain profitability within smaller sites. As such, we estimate that 2.7% share would generate 24 sq.m of supportable floorspace by 2031, deemed insufficient for the subject site.

- **Household goods** – While household goods retailers also tend to be more prevalent in larger, centralised centres, with a planned 7 tenancies at the subject site, we estimate that 5.2% of household goods expenditure could be retained at the subject site, justifying a tenant of up to 85 sq.m, likely retailer of smaller items such as giftware or homewares.

- **Leisure** – We estimate that 17.3% of expenditure within this category could be retained at the subject site, equating to 45 sq.m. With a lack of newsagencies within the trade area, an integrated provision that includes a newsagency and post office is recommended for consideration, accounting for up to 100 sq.m of floorspace.

- **General retail** – Retailers such as those involved with sales of cosmetics and toys are deemed inappropriate for the subject site, based on its' scale and composition. With no pharmacies located within the trade area, and two larger Chemist Warehouse/Priceline offerings along Church Street, we recommend consideration of a small format pharmacy at the subject site, estimated to capture 26.8% of category expenditure within the category and supporting 104 sq.m of floorspace by 2031.

- **Retail services** – Hairdresser, beauty salon and barber provision are recommended for consideration within this category, estimated to retain 29.0% of expenditure and 72 sq.m of floorspace by 2031.

- We also estimate that 8.1% of total annual retail demand would be generated from beyond the defined trade area (i.e. in the form of spending attracted from people visiting residents, passing traffic, etc).

- **Non-retail shops** – These uses support retailers and increase amenity for local residents, with tenants including professional services (real estate agencies, accountants etc) and small format fitness studios and the like. We recommend consideration of 70 – 150 sq.m of floorspace depending on tenant.

- **Childcare** – The Australian Children's Education and Care Quality Authority (ACECQA) shows 1 childcare centre in the trade area (Kiddie Garden Daycare & Pre-school) which supplies 74 long day care approved places. With the population due to increase from 1,770 to 3,020 by 2031 and 3,570 by 2031, and no development approvals found (Cordell Connect 2024), the subject site is deemed well placed to provide a childcare centre to support the future trade area population.

- Up to 680 sq.m of retail specialty is supportable at the subject site in 2031, along with supporting non-retail shop provision and a childcare centre.

Retail impact test

- Retailers within the trade area are expected to experience moderate declines of between 7.7% and 9.9% once the subject site is developed. Beyond the trade area, impacts are necessarily diluted as more alternatives are available, including offerings, and travel to the subject site becomes less convenient.

- The estimated trading impacts arising from the development of the planned retail provision at the subject site on other retailers in the surrounding area are projected to be minor/moderate and are unlikely to threaten their viability.

Introduction

This report presents an independent market assessment of the scale and mix of retail uses considered suitable for a development at 9 Albert Street & 31 O'Connell Street, North Parramatta New South Wales (the subject site). It also provides an overview of the types of non-retail uses considered supportable.

The report has been prepared in accordance with instructions received from the client, and is presented in five sections as follows:

- **Section 1** details the regional context and location of the subject site, including an overview of major projects/infrastructure investment in the region, a review of the proposed development scheme.
- **Section 2** examines the trade area likely to be served by the subject site, including projected population levels; the socio-demographic profile of the population; and the estimated current and future retail expenditure capacity of trade area residents.
- **Section 3** provides an assessment of the retail floorspace demand generated by trade area residents and assesses the potential scale of supportable retail facilities for retail provision at the subject site.
- **Section 4** tests the impacts of the proposed retail development on surrounding retailers.
- **Section 5** provides a summary of key findings and recommendations.

Section 1: Site and regional context

This section of the report details the regional context and site location of the proposed development.

1.1 Subject site and local context

The subject site is located at 9 Albert Street & 31 O'Connell Street, North Parramatta (refer Map 1.1), approximately 20 km west of the Sydney Central Business District (CBD) and within the Parramatta Local Government Area (LGA). An independent analysis of potential retail uses is required to support a future planning proposal.

We understand the following in relation to the subject site:

- The site benefits from a B4 Mixed Use zoning enabling new residential mixed-use to be developed on the site.
- The site comprises some 8,910 sq.m land area with an approximate 162 m frontage to O'Connell Street and 81 m to Albert Street.
- Floor plans prepared by DKO Architects and dated 6th February 2024 (refer Figure 1.1 and 1.2) call for a childcare centre of 416 sq.m / 120 places and 7 retail specialty tenancies totalling 755 sq.m.

According to the Australian Bureau of Statistics (ABS) 2021 Census, the population of the Parramatta LGA was 256,729 in mid-2021, up from 260 296 at the 2016 Census, an average of 0.3% per annum.

Parramatta falls within the Greater Sydney Commissions Central City district, with Greater Parramatta in the core of the Central River City vision as part of the *"A Metropolis of Three Cities"* plan and the updated Six Cities Vision which now incorporates Newcastle, Gosford, Greater Parramatta, Sydney CBD, Wollongong and Badgerys Creek. Being near the geographic centre of Sydney, Parramatta is set to be the commercial centre of substantial portions of Greater Western Sydney and the Hills District. The region's economy is centred on education, health, and research institutions as well as administration, finance, and business services. This forms the mainstay of the Greater Parramatta and Olympic Peninsula Economic Corridor.

1.2 Key planning and infrastructure

1.2.1 Parramatta light rail

The Parramatta Light Rail is part of the NSW Government's infrastructure delivery program and is designed to improve the accessibility of Greater Parramatta to other strategic centres. Services are expected to commence with Stage 1 by mid-2024, with Stage 1 to connect Westmead to Carlingford via the Parramatta CBD and Camellia over 12 kilometres, with a total of 16 stops. Notably, the Parramatta CBD will be connected to the Westmead precinct, key cultural facilities within Greater Parramatta such as Bankwest Stadium and the new Powerhouse Museum, and new university campuses within the Greater Parramatta region.

Stage 2 is currently in early planning and will connect Stage 1 and the Parramatta CBD to Ermington, Melrose Park, Wentworth Point and Sydney Olympic Park. It will have 10 - 12 stops over a 10-kilometre track, eventually connecting to the Sydney Metro West rail in Parramatta and Sydney Olympic Park.

1.2.2 Sydney metro west

The NSW Government plans to deliver the Sydney Metro West by 2032, providing a new underground rail connection between the Parramatta CBD and Sydney CBD within the next 10 years. The Greater Sydney Services and Infrastructure Plan 2018 identifies the Sydney Metro West as the NSW Government's priority rail network extension project. Sydney Metro West will include new metro stations at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock, The Bays, Pyrmont and Hunter Street in the Sydney CBD. Two potential station locations are being investigated at Rosehill and west of Sydney Olympic Park.

When operational, the metro line will be capable of moving more than 40,000 people an hour in each direction and will double the current rail capacity between the Parramatta and Sydney CBD's. The Parramatta Metro Station will be strategically located to the north of the existing Parramatta bus and railway station, adjacent to George, Macquarie, Church, and Smith Streets.

The new metro station will integrate with the proposed Civic Link, a green pedestrianised public space, from Parramatta Square in the south to Parramatta River in the north and will provide an additional mode of transportation to complement the existing bus and rail interchange.

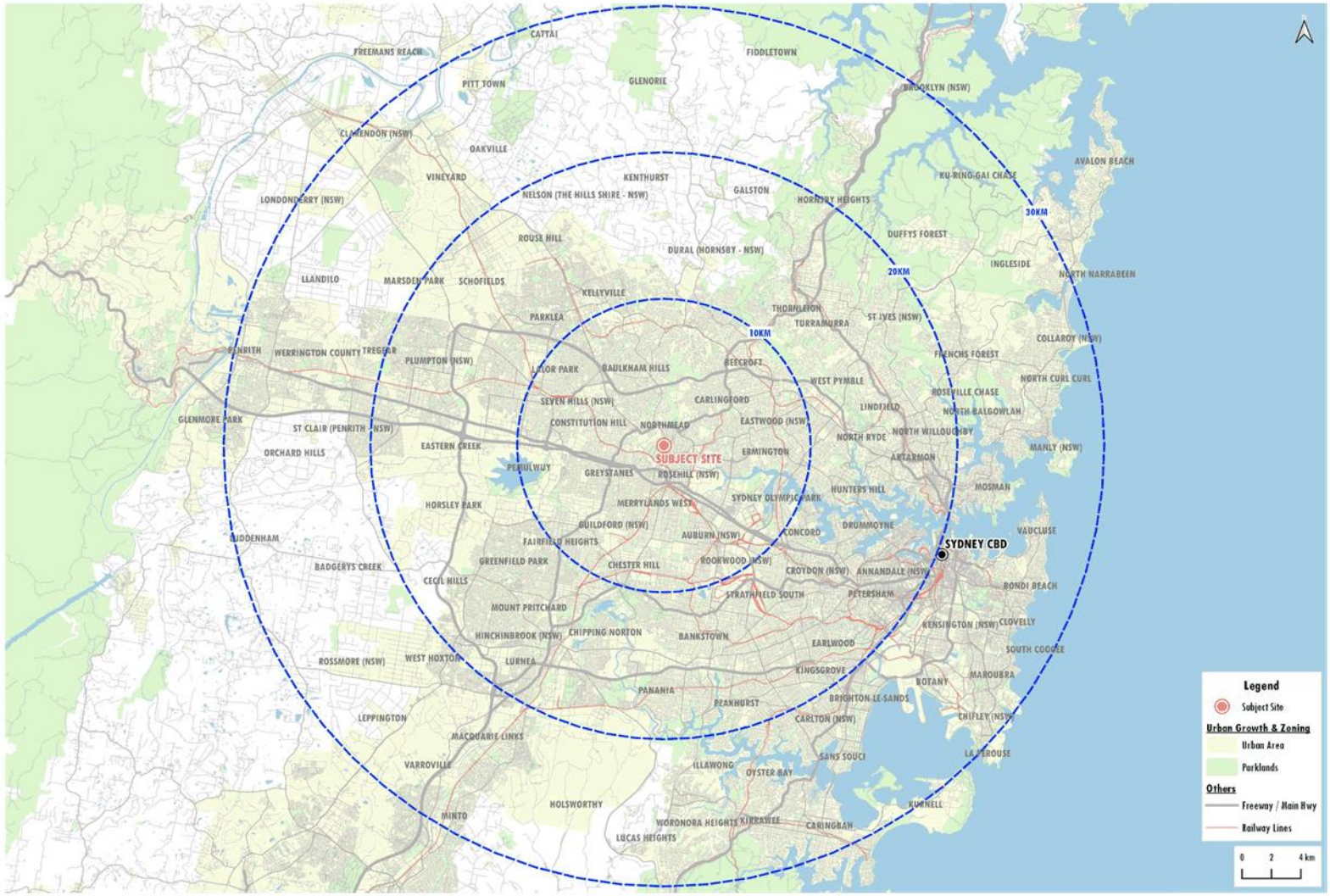
1.2.3 Local Strategic Planning Statement City Plan 2036

Council's Local Strategic Planning Statement (LSPS), in effect from March 2020, sets out a 20-year land use planning vision balancing the need for housing and economic growth while also protecting and enhancing housing diversity, heritage, and local character. The LSPS vision is:

> "*In 20 years Parramatta will be a bustling, cosmopolitan and vibrant metropolis, the Central City of Greater Sydney It will be a Smart City that is well connected to the region, surrounded by high quality and diverse residential neighbourhoods with lots of parks and green spaces It will be innovative and creative and be well supported by strong, productive and competitive employment precincts It will be a place that people will want to be a part of.*"

Greater Parramatta is identified as the largest city centre in Western Sydney, and the primary jobs, services, economic and business centre for the LGA. The LSPS recognises the need to offer a diverse range of services and experiences to make it an attractive place to live, work and play, putting forth that providing improved cultural and recreational opportunities is fundamental to attracting knowledge intensive businesses into Parramatta and assist in differentiating the City from other business parks in Greater Sydney. The LSPS outlines that by 2036 Parramatta will have an additional 87,900 dwellings, 198,000 more residents and 72,000 more jobs in strategic centres and strategic employment lands.

Section 1: Site and regional context



Map 1.1: 9 Albert & 31 O'Connell Street North Parramatta
Regional context

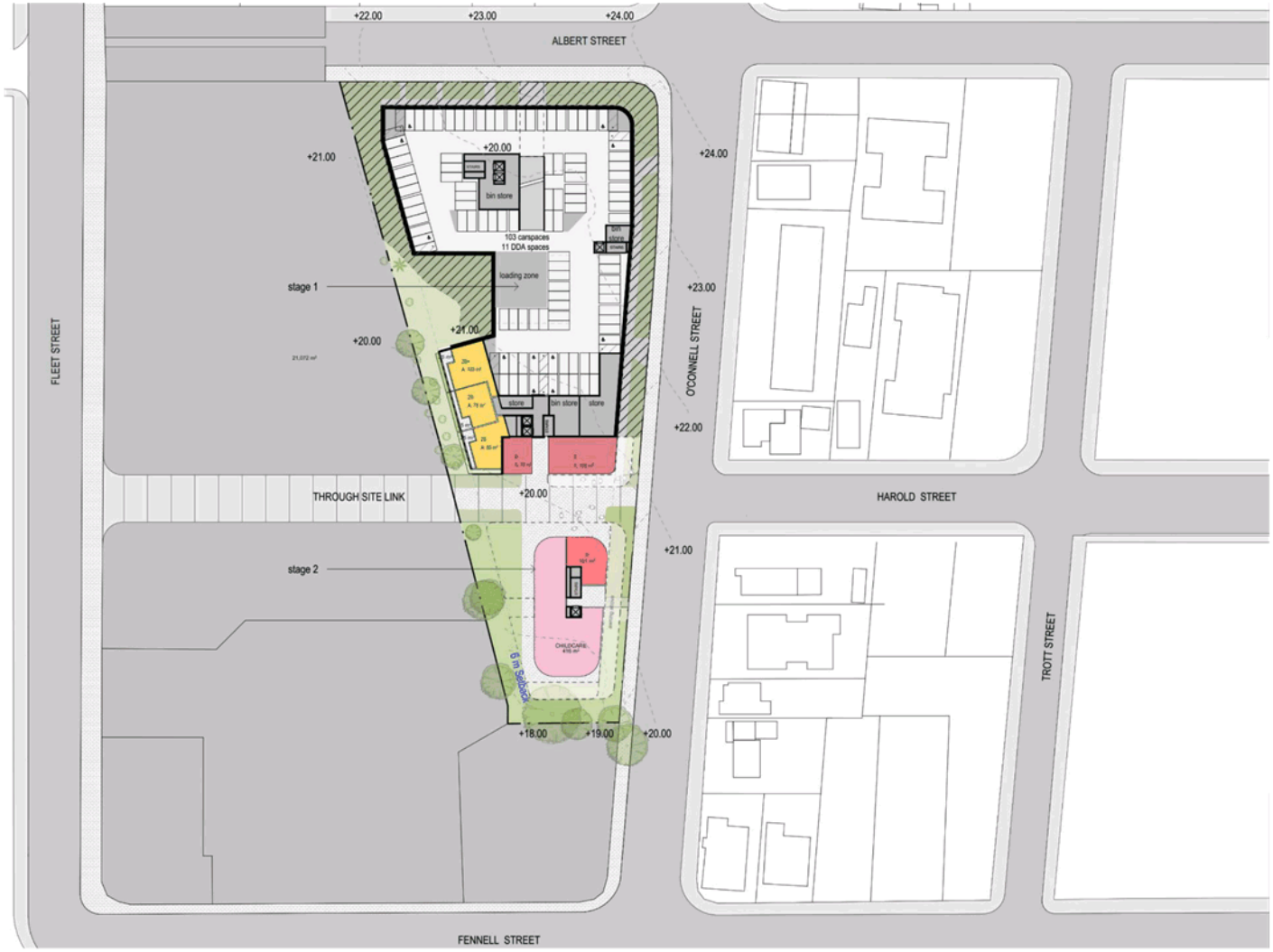


Figure 1.1: 9 Albert & 31 O'Connell Street North Parramatta
Indicative retail layout plan- lower ground

Section 1: Site and regional context

Figure 1.2: 9 Albert & 31 O'Connell Street North Parramatta

Indicative retail layout plan – upper ground

Section 2: Trade area analysis

This section of the report examines the trade area likely to be served by the subject site, including projected population levels; the socio-demographic profile of the population; and the estimated current and future retail expenditure capacity of trade area residents.

2.1 Trade area definition

The extent of the trade area or catchment that is served by any retail centre is shaped by the interplay of several critical factors. These factors include:

i. The relative attraction of the retail facility or centre, in comparison with alternative competitive retail facilities. The factors that determine the strength and attraction of any centre are primarily its scale and composition (in particular the major trader or traders that anchor the centre); its layout and ambience; and car-parking, including access and ease of use.

ii. The proximity and attractiveness of competitive retail tenants, or centres. The locations, compositions, quality, and scale of competitive retail facilities all serve to define the extent of the trade area which a shopping centre or retail facility is effectively able to serve.

iii. The available road network and public transport infrastructure, which determine the ease (or difficulty) with which customers can access a shopping centre, or retail facility.

iv. Significant physical barriers which are difficult to negotiate and can function as delineating boundaries to the trade area served by an individual shopping centre, or retail facility.

Having regard for the above, the trade area that could potentially be served by retail facilities at the subject site is described in Map 2.1.

Section 2: Trade area analysis

Map 2.1: 9 Albert & 31 O'Connell Street North Parramatta
Trade area and competition

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2.2 Trade area population

Table 2.1 and Chart 2.1 detail the current and projected population levels within the trade area, compiled from a range of sources, including the following:

- Australian Bureau of Statistics Census of Population and Housing.
- Australian Bureau of Statistics Dwelling Approvals Data.
- Australian Bureau of Statistics Estimated Residential Population Data (ERP).
- Department of Planning and Environment 2022 Population Projections.
- Other investigations of future residential development, undertaken by this office.

On this basis, the trade area population is estimated at 1,770 at mid-2021, and is forecast to reach 3,570 people by 2036, reflecting average annual growth of 1.6% per annum to 2026, 9.5% from 2026 to 2031, and 3.4% from 2031 to 2036. These projections reflect the inclusions of the following proposed residential developments within the trade area:

- **355-375 Church Street** – A joint venture between McDonalds and Stockland Corporation, the development is currently at the early planning stage and is planned to include 350 apartments, 1,565 sq.m of retail space and a new McDonalds restaurant. Completion is assumed in the 2026 – 2031 period.
- **Subject site** – Summarised in Section 1.1, the development is slated to include 370 apartments, a childcare centre and supporting retail specialties. Completion is assumed in the 2026 – 2031 period.
- **Fleet/Fennell Street** – Abutting the subject site lot and owned by NSW Health, development of around 350 dwellings is expected post 2031.

Table 2.1
31 O'Connell st & 9 Albert st Parramatta trade area population, 2016-2036*

	Estimated population		Projected population		
	2016	2021	2026	2031	2036
Trade Area	2,100	1,770	1,920	3,020	3,570
Average annual growth (no.)		-66	30	220	110
Average annual growth (%)		-3.4%	1.6%	9.5%	3.4%

**As at June*
Source: ABS Census 2021; NSW Department of Planning and Environment 2022; Transport for NSW; Macroplan

2.3 Socio-demographic profile

Table 2.2 and Chart 2.1 illustrate the socio-demographic profile of the trade area population, compared with benchmarks for Greater Sydney and Australia, based on data from the 2021 ABS Census of Population and Housing. The key points to note include the following:

- Per capita and per household income levels of trade area residents are 15.7% and 37.6% below the Greater Sydney averages, respectively.
- The average age of trade area residents, at 37.0 years, is slightly below the Greater Sydney average (37.5 years).
- Home ownership levels within the trade area (32.0%) are significantly below the respective average for Greater Sydney (60.0%).
- The trade area population is 40.8% Australian born, below the Greater Sydney average of 61.9%. Of those born overseas, residents hailing from Asia and Europe account for 36.7% and 4.6% respectively.
- Traditional families (i.e. couples with dependent children) are the most prevalent household type, accounting for 36.4% of trade area households, compared with 40.8% for Greater Sydney.

The trade area population is generally characterised by slightly younger, overseas born families.

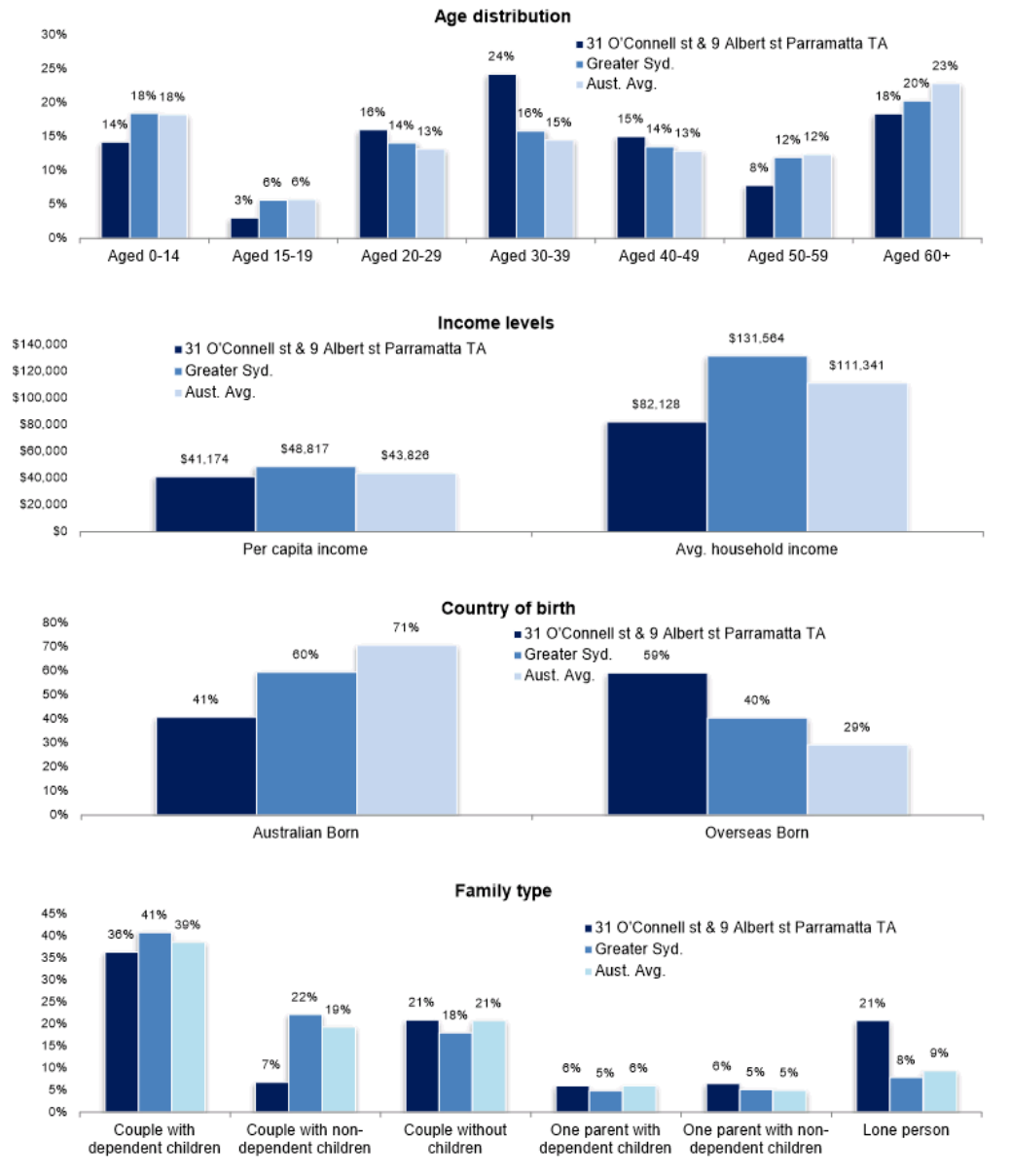
Table 2.2
31 O'Connell st & 9 Albert st Parramatta trade area - socio-demographic profile, 2021

Census item	Trade Area	Greater Syd. avg.	Australia avg.
Per capita income	$41,174	$48,817	$43,826
Var. from Greater Syd.	*-15.7%*		
Avg. household income	$82,128	$131,564	$111,341
Var. from Greater Syd.	*-37.6%*		
Avg. household size	2.0	2.7	2.5
Age distribution (% of population)			
Aged 0-14	14.2%	18.4%	18.3%
Aged 15-19	3.0%	5.6%	5.7%
Aged 20-29	16.0%	14.1%	13.2%
Aged 30-39	24.3%	15.9%	14.5%
Aged 40-49	15.0%	13.5%	12.9%
Aged 50-59	7.8%	12.0%	12.4%
Aged 60+	18.4%	20.3%	22.8%
Average age	37.0	37.5	38.8
Housing status (% of households)			
Owner (total)	32.0%	60.0%	65.1%
• Owner (outright)	12.0%	27.3%	30.6%
• Owner (with mortgage)	20.1%	32.7%	34.5%
Renter	64.0%	35.3%	30.3%
Birthplace (% of population)			
Australian born	40.8%	59.6%	70.8%
Overseas born	59.2%	40.4%	29.2%
• Asia	36.7%	20.8%	12.7%
• Europe	4.6%	5.2%	4.2%
• Other	17.9%	14.5%	12.4%
Family type (% of population)			
Couple w dep't child.	36.4%	40.8%	38.6%
Couple w non-dep't child.	6.8%	22.2%	19.3%
Couple without child.	21.0%	18.0%	20.8%
One parent w dep't child.	6.0%	4.9%	6.0%
One parent w non-dep't	6.5%	5.2%	5.0%
Lone person	20.8%	7.9%	9.4%

Source: ABS Census of Population & Housing 2021; Macroplan

Chart 2.1

31 O'Connell st & 9 Albert st Parramatta trade area - socio-demographic profile, 2021



Source: ABS Census of Population & Housing 2021; Macroplan

2.4 Retail expenditure

Macroplan estimates retail expenditure capacity generated by the trade area residents based on information sourced from Market Data Systems (MDS), which uses a detailed micro simulation model of household expenditure behaviour for all residents of Australia. The model considers information from a wide variety of sources including the regular ABS Household Expenditure Surveys, national accounts data, Census data and other information. We consider MarketInfo data to be an accurate measure of available retail expenditure and it is widely relied on in the retail industry.

Total retail expenditure is detailed in several categories, as follows:

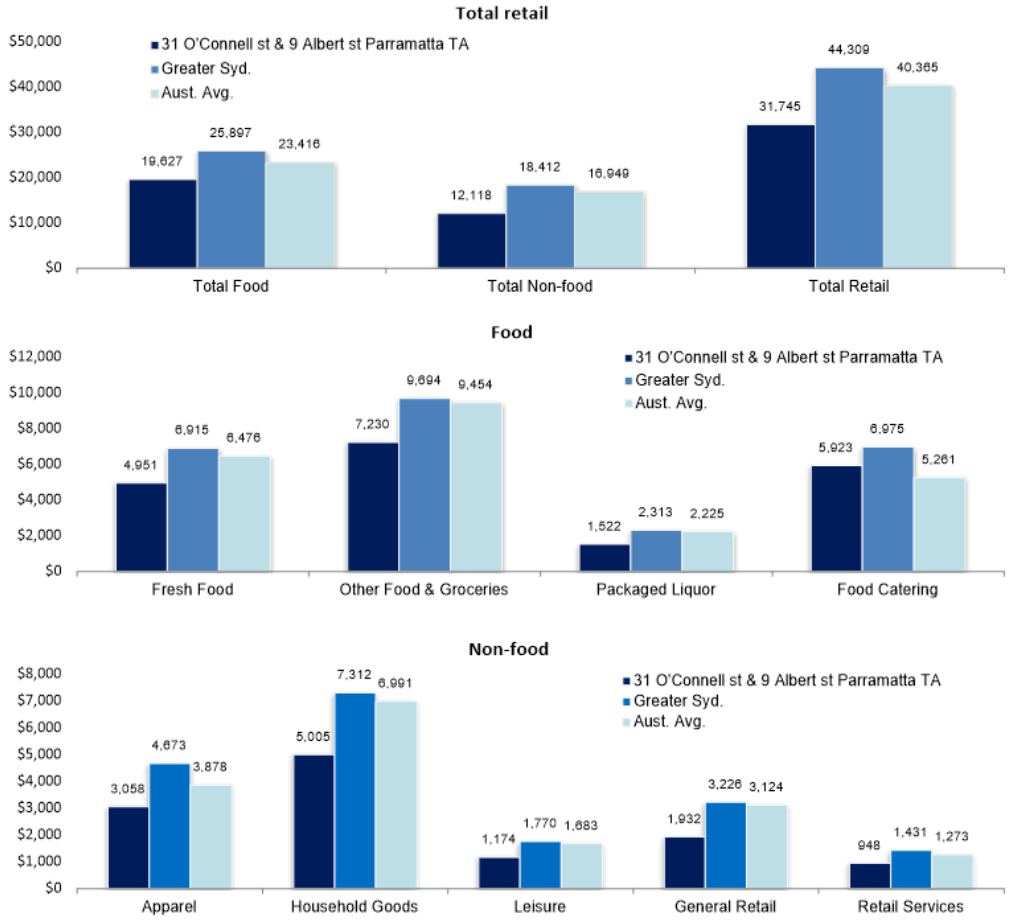
- **Take-home food and groceries** – goods typically sold in supermarkets and specialty fresh food stores.
- **Packaged liquor** – packaged beer, wine, and spirits such as those purchased at bottle-shops and liquor outlets.
- **Food catering** – cafes, take-away outlets, and restaurants, including liquor consumed on such premises.
- **Apparel** – clothing, footwear, fashion, and accessories.
- **Household goods** – giftware, electrical, computers, furniture, homewares, and hardware goods.
- **Leisure** – sporting goods, music, DVDs, games, books, newsagents, and film processing/photography.
- **General retail** – pharmaceutical goods, cosmetics, toys, florists, and mobile phones.
- **Retail services** – key cutting, shoe repairs, hair, and beauty.

Chart 2.2 details the estimated retail spending levels of the trade area on a per household basis for the year 2023/24 and compares these estimates with the average for Greater Sydney and Australia. Spending estimates are presented inclusive of GST. The following points are noted:

- Total retail expenditure per household, estimated at $31,745 per annum, is 28.4% below the Greater Sydney average. Within this, spend on food and non-food are 24.2% and 34.2% below the respective averages.
- Within the food category, spend per household on packaged liquor is 34.2% below the Greater Sydney average, and spend on fresh food and food catering are 28.4% and 15.1% below the Greater Sydney averages, respectively.
- Within the non-food retail categories (i.e. generally considered discretionary retail), spend on apparel, household goods, leisure and retail services are 34.6%, 31.5%, 33.6% and 33.8% below benchmark, respectively.

Chart 2.2

31 O'Connell st & 9 Albert st Parramatta trade area - retail expenditure per household, 2023/2024*



**Including GST*

Source: MarketInfo; Macroplan

Table 2.3 presents the estimated total retail expenditure capacity generated by the trade area population, by trade area sector, over the period from 2024 to 2036. Expenditure forecasts are presented inclusive of GST and in inflated dollars.

The retail expenditure capacity of the trade area is forecast to increase from $30.8 million in 2024 to $84.7 million by 2036. This reflects an average annual growth rate of 8.8% over the forecast period comprising the following three components:

- Residential population growth, which is expected to average 4.8% per annum.
- Real growth in per capita retail expenditure, which is expected to average 1.4% per annum over the forecast period.
- Retail inflation assumed to average 2.6% per annum.

Table 2.3
31 O'Connell st & 9 Albert st Parramatta trade area - retail expenditure ($M), 2024-2036*

	2024	2026	2031	2036	Average annual growth ($M)	Average annual growth (%)
Retail expenditure	30.8	35.7	63.7	87.2	4.5	9.0%

**Inflated dollars & including GST*
Source: MarketInfo; Macroplan

Table 2.4 presents projections of retail expenditure for the trade area by retail category, over the period 2024 to 2036. Food, liquor, and groceries (FLG) expenditure in the trade area is estimated at $12.7 million in 2024, and accounts for 43% of total retail expenditure. FLG expenditure is estimated to increase to $36.2 million by 2036, reflecting an average annual growth rate of 9.1% per annum. Strong growth is expected across all retail categories, with food catering to be the fastest growing at 9.5% per annum.

Table 2.4
31 O'Connell st & 9 Albert st Parramatta trade area - retail expenditure by category ($M), 2024-2036*

Year ending June	FLG	Food catering	Apparel	Household goods	Leisure	General retail	Retail services	**Total retail**
2024	12.7	5.5	2.8	4.6	1.1	1.8	0.9	29.4
2026	14.0	6.1	3.1	5.1	1.2	2.0	1.0	32.4
2031	25.3	11.2	5.5	9.0	2.1	3.5	1.7	58.3
2036	36.2	16.2	7.6	12.7	3.0	4.9	2.5	83.0
Average annual growth ($M)								
2024-2036	2.0	0.9	0.4	0.7	0.2	0.3	0.1	4.5
Average annual growth (%)								
2024-2036	9.1%	9.5%	8.6%	8.8%	8.7%	8.8%	9.0%	9.0%

**Inflated dollars & including GST*
Source: MarketInfo; Macroplan

2.5 Competition

This section of the report outlines the existing and future competitive retail environment in which the proposed development will operate. Table 2.5 details the provision of retail facilities in the region, with the previous Map 2.1 illustrating their locations.

One proposed retail facility is identified, the mixed-use development summarised in section 2.2 at 355-375 Church Street Parramatta. 1,565 sq.m of retail specialty is planned, within which we assume 120 sq.m of supermarket/grocery provision.

Table 2.5
31 O'Connell st & 9 Albert st Parramatta - schedule of local retail facilities

	Retail GLA* (sq.m)	Dist. by road from subject site (km)
Within trade area		
Supermarkets & grocery stores		
• Seng Seng Mart	100	0.7
• Star Grocery	250	1.3
Centres		
• LCC (p)	1,565	1.1
Beyond trade area		
Supermarkets & grocery stores		
• North Parramatta Supermarket	140	1.0
• Hiva Supermarket	120	1.0
• Hyperstar Market	130	1.2
• Coles Parramatta North	2,232	1.3
• Spar Supermarket	150	1.3
• Thalib Mart Asian Grocery	130	1.5
• Foodmart88	100	2.1
• North Parramatta Convenience Store	80	1.1
• Paradise Corner Shop	90	1.2
• Xpress Mart	100	1.5
• 7-Eleven	170	1.5

** Estimated*
Source: Property Council of Australia; Cordells; Macroplan

Section 3: Centre floorspace potential

This section of the report assesses the retail floorspace demand generated by trade area residents, and the potential scale of supportable retail facilities for a retail provision at the subject site.

3.1 Retail floorspace analysis

Modelling retail demand for a given area or centre is imprecise and depends on a range of factors. Therefore, the floorspace demand analysis presented in this section should be viewed as indicative.

Table 3.1 details the estimated level of traditional retail floorspace demand by residents in the trade area based on the retail expenditure generated (excluding large format retail and non-retail facilities such as cinema/entertainment, medical, personal services, etc.). This indicative retail floorspace demand would be served by retail facilities located within and beyond the trade area.

The floorspace figures in Table 3.1 are calculated by applying an average Retail Turnover Density (RTD) to the estimated available retail sales volume by category. The RTD is simply the level of sales per sq.m which retailers in each category typically achieve. Adopted RTD levels are the highest for retailers in FLG (including supermarkets), at $10,500 per sq.m, and average around $7,100 per sq.m. Estimated retail floorspace demand by residents in the trade area is forecast to increase from 4,110 sq.m in 2024 to around 7,200 sq.m in 2036.

Table 3.1
31 O'Connell st & 9 Albert st Parramatta trade area - estimated retail floorspace demand (sq.m), 2024-2036

Year ending June	FLG	Food catering	**Total food**	Apparel	H'hold goods	Leisure	General retail	Retail services	**Total non-food**	**Total retail**
2024	1,207	762	**1,970**	567	1,014	163	243	152	**2,140**	**4,110**
2026	1,232	782	**2,010**	573	1,028	165	247	155	**2,170**	**4,180**
2031	1,828	1,178	**3,010**	830	1,503	240	361	228	**3,160**	**6,170**
2036	2,146	1,403	**3,550**	950	1,738	276	417	267	**3,650**	**7,200**
2024-2036	959	659	**1,620**	387	736	115	177	117	**1,530**	**3,150**
RTD*	10,500	7,193	**9,200**	4,988	4,568	6,668	7,350	5,775	**5,200**	**7,100**

**Retail Turnover Density - Turnover ($) per sq.m in 2024, growth assumed at 4.0% p.a*
Source: MarketInfo; Macroplan

3.2 Potential supportable floorspace

The amount of floorspace which can be supported at the subject site, and which will be appropriate to meet the needs of the trade area population, will be driven primarily by the market share which the centre can reasonably expect to retain from the trade area population.

Retail provision at the subject site would have the potential to serve mainly the food, grocery, and convenience-oriented needs of residents, with retention rates for each retail category reflective of the existing and future provision

of retail facilities in the surrounding area, the socio-demographic profile of current and future trade area residents, as well as the planned scale of retail provision at the subject site which includes 7 tenancies across 755 sq.m.

Table 3.2 provides indicative estimates of the amount of supportable retail floorspace at the subject site, considering the estimated levels of expenditure which it is considered likely to retain and with regard to the following:

- **FLG** – Typically 40 – 70% of this category is retained by a supermarket-based retail centre. Given the lack of major supermarket at the subject site we assume a share of expenditure that a small format, local supermarket/grocer could retain, estimated at 9.7% of the trade area. This equates to an estimated 192 sq.m of floorspace supportable by 2031.
- **Food catering** – Café/takeaway uses are assumed, with share of expenditure estimated at 12.8%. This equates to 192 sq.m of floorspace supportable by 2031.
- **Apparel** – Typically retailers in this category are more successful in larger, centralised centres and can struggle to maintain profitability within smaller sites. As such, we estimate that 2.7% share would generate 24 sq.m of supportable floorspace by 2031, deemed insufficient for the subject site.
- **Household goods** – While household goods retailers also tend to be more prevalent in larger, centralised centres, with a planned 7 tenancies at the subject site, we estimate that 5.2% of household goods expenditure could be retained at the subject site, justifying a tenant of up to 85 sq.m, likely retailer of smaller items such as giftware or homewares.
- **Leisure** – We estimate that 17.3% of expenditure within this category could be retained at the subject site, equating to 45 sq.m. With a lack of newsagencies within the trade area, an integrated provision that includes a newsagency and post office is recommended for consideration, accounting for up to 100 sq.m of floorspace.
- **General retail** – Retailers such as those involved with sales of cosmetics and toys are deemed inappropriate for the subject site, based on its' scale and composition. With no pharmacies located within the trade area, and two larger Chemist Warehouse/Priceline offerings along Church Street, we recommend consideration of a small format pharmacy at the subject site, estimated to capture 26.8% of category expenditure within the category and supporting 104 sq.m of floorspace by 2031.
- **Retail services** – Hairdresser, beauty salon and barber provision are recommended for consideration within this category, estimated to retain 29.0% of expenditure and 72 sq.m of floorspace by 2031.
- We also estimate that 8.1% of total annual retail demand would be generated from beyond the defined trade area (i.e. in the form of spending attracted from people visiting residents, passing traffic, etc).
- **Non-retail shops** – These uses support retailers and increase amenity for local residents, with tenants including professional services (real estate agencies, accountants etc) and small format fitness studios and the like. We recommend consideration of 70 – 150 sq.m of floorspace depending on tenant.
- **Childcare** – The Australian Children's Education and Care Quality Authority (ACECQA) shows 1 childcare centre in the trade area (Kiddie Garden Daycare & Pre-school) which supplies 74 long day care approved places. With the population due to increase from 1,770 to 3,020 by 2031 and 3,570 by 2031, and no

development approvals found (Cordell Connect 2024), the subject site is deemed well placed to provide a childcare centre to support the future trade area population.

This analysis indicates that up to 680 sq.m of retail specialty is supportable at the subject site by 2031, along with supporting non-retail shop provision and a childcare centre.

Table 3.2
31 O'Connell st & 9 Albert st Parramatta - indicative supportable floorspace by category (sq.m), 2024-2036

Year ending June	FLG	Food catering	**Total food**	Apparel	H'hold goods	Leisure	General retail	Retail services	**Total non-food**	**Total retail**
% retail expenditure retained										
Main TA	**9.7%**	**12.8%**	**10.9%**	**2.7%**	**5.2%**	**17.3%**	**26.8%**	**29.0%**	**9.6%**	**10.2%**
2024	127	105	**230**	17	57	30	70	48	**220**	**450**
2026	129	108	**240**	17	58	31	71	49	**230**	**470**
2031	192	163	**350**	24	85	45	104	72	**330**	**680**
2036	225	194	**420**	28	98	52	121	84	**380**	**800**
2024-2036	101	91	**190**	11	41	21	51	37	**160**	**350**
RTD*	10,500	7,193	**9,100**	4,988	4,568	6,668	7,350	5,775	**6,100**	**7,600**

**Retail Turnover Density - Turnover ($) per sq.m in 2024, growth assumed at 4.0% p.a*
Source: MarketInfo; Macroplan

3.3 Recommended composition

Table 3.3 compares the supportable floorspace estimations in Table 3.2 and the current development plan, providing a breakdown of the recommended floorspace by category at the subject site. It is noted that the current planned tenancies all fall within the supportable floorspace estimations.

Table 3.3
31 O'Connell st & 9 Albert st Parramatta - recommended composition, 2031 (GLA)

Tenancy	Supportable (sq.m)	Recommended (sq.m)	Recommended (% share)
Retail specialties			
• FLG	192	158	13.5%
• Food catering	163	140	12.0%
• Apparel	24	0	0.0%
• Household goods	85	74	6.3%
• Leisure*	45	76	6.5%
• General retail	104	101	8.6%
• Retail services	72	70	6.0%
Total retail specialties	**684**	**619**	**52.9%**
• Non-retail shops		136	11.6%
• Childcare		416	35.5%
Total		**1,171**	**100.0%**

**Integrated offering with non-retail uses*
Source: Macroplan

Section 4: Retail impact test

This section analyses the anticipated impacts on competitive retailers within the wider region. To understand whether any particular centre may be impacted to the extent that its continued viability may be in question, we have estimated specific retail impacts that we expect across the surrounding competitive network once the subject site is developed. Generally, retail trading impacts are considered as follows:

- Less than 5% is considered minor/negligible.
- Between 5% and 10% are considered moderate.
- Between 10% and 15% are considered significant but acceptable.
- Greater than 15% are considered unacceptable and could threaten the viability of a competitor.

These estimates provide indications as to whether the scale of the development is reasonable and whether any surrounding retailers are likely to be at risk to the extent that the community would suffer a net disbenefit as a result. In considering likely trading impacts on any centre or individual retailer, it must first be acknowledged that such estimation can only realistically expect to provide a broad indication of likely outcomes, since there are many factors which can change in response to any new retail development. The impacted centre or retailer could take several actions which may mitigate the extent of the impact. Expansions and improvements may be undertaken at other centres throughout the region, and these factors can change the nature of the impact of the new provision being developed.

It is much more reasonable for the purposes of impact analysis, therefore, to consider the likely broad changes in competitive circumstances, and in particular the changes in availability of retail spending for competitive retailers, which can reasonably be expected to result from the development of the subject site. These broad changes effectively set the market conditions within which the competitive retailers will operate as a result of this development, and reasonable conclusions can then be drawn about the possible impacts of these broad changes in market conditions.

The following factors are of relevance in terms of how the likely impacts will play out:

- The distance of each retailer, by road, from the proposed development.
- The size and structure of the subject site, in terms of total relevant retail floorspace.
- The types of tenants and their core offerings.
- The respective role and function of each retailer.
- The relative accessibility and convenience of the impacted retailer compared with the proposed development.

- The estimated performance of the retailer (in current sales) and projected future performance. This accounts for any future developments in the region that might also impact on the future sales of existing retailers.

Table 4.1 presents an impact analysis for relevant retailers which may be impacted by the proposed development. The analysis is described as follows:

- Completion of the subject site development is assumed at 2029.
- The estimated 2024 sales for each of the existing retailers are estimated, based on publicly available information, and derived from appropriate sales productivity levels for comparable offerings.
- The projected sales potential for each retailer is estimated (at 2029) and presented with and without the subject site development.
- The sales potential for each retailer in 2029 under the development scenario is estimated by allocating the anticipated trading impacts on each retailer from the no development scenario.
- The estimated impact on each retailer in 2029 are specified, in dollars and as a percentage of sales.
- The resultant growth in sales potential for each centre from 2024 are provided.

The analysis in Table 4.1 shows that retailers within the trade area are expected to experience moderate declines of between 7.7% and 9.9% once the subject site is developed. Beyond the trade area, impacts are necessarily diluted as more alternatives are available, including offerings, and travel to the subject site becomes less convenient.

In summary, the estimated trading impacts arising from the development of the planned retail provision at the subject site on other retailers in the surrounding area are projected to be minor/moderate and are unlikely to threaten their viability.

Section 4: Retail Impact Test

Table 4.1

31 O'Connell st & 9 Albert st Parramatta - estimated impact on specific retailers ($M)*

Centre	Dist. from site (km)	Retail GLA (sq.m)	Est. sales 2024 ($M)	Proj. 2029 No dev't ($M)	Proj. 2029 With dev't ($M)	Proj. 2034 With dev't ($M)	Est. impact 2029 $M	Est. impact 2029 %	Est. impact 2029 Dist.	Change with dev't (%) 2024-29	Change with dev't (%) 2024-34
Subject site		**619**			**11.2**						
Within trade area											
Supermarkets & grocery stores											
• Seng Seng Mart	0.7	100	1.3	2.2	1.9	3.5	-0.2	-9.7%	1.9%	47.5%	161.9%
• Star Grocery	1.3	250	3.3	5.4	5.0	8.8	-0.4	-7.7%	3.7%	50.6%	167.5%
Centres											
• LCC (p)	1.1	1,565	14.2	23.2	20.9	37.2	-2.3	-9.9%	20.5%	47.0%	161.2%
Other retailers		800	10.6	17.2	15.6	27.6	-1.7	-9.7%	14.8%	47.5%	161.9%
TA sub-total		**2,715**	**29**	**48**	**43**	**77**	**-5**	**-9.6%**	**40.9%**	**47.6%**	**77.6%**
Beyond trade area											
Supermarkets & grocery stores											
• North Parramatta Supermarket	1.0	140	1.8	3.0	2.8	4.9	-0.2	-7.6%	2.1%	50.7%	167.8%
• Hiva Supermarket	1.0	120	1.6	2.6	2.4	4.2	-0.2	-7.5%	1.7%	51.0%	168.2%
• Hyperstar Market	1.2	130	1.7	2.8	2.6	4.7	-0.2	-6.4%	1.6%	52.7%	171.3%
• Coles Parramatta North	1.3	2,232	29.5	48.1	46.8	83.1	-1.3	-2.6%	11.3%	58.9%	182.3%
• Spar Supermarket	1.3	150	2.0	3.2	3.1	5.4	-0.2	-5.2%	1.5%	54.8%	174.9%
• Thalib Mart Asian Grocery	1.5	130	1.7	2.8	2.7	4.8	-0.1	-4.3%	1.1%	56.2%	177.3%
• Foodmart88	2.1	100	1.3	2.2	2.1	3.7	-0.1	-3.5%	0.7%	57.5%	179.7%
Centres											
• North Parramatta Convenience Store	1.1	80	0.7	1.2	1.1	1.9	-0.1	-9.9%	1.1%	47.0%	161.1%
• Paradise Corner Shop	1.2	90	0.8	1.3	1.2	2.2	-0.1	-8.8%	1.0%	48.9%	164.5%
• Xpress Mart	1.5	100	0.9	1.5	1.4	2.5	-0.1	-6.8%	0.9%	52.1%	170.2%
• 7-Eleven	1.5	170	1.5	2.5	2.4	4.3	-0.1	-3.6%	0.8%	57.4%	179.6%
Other retailers		4,000	36.4	59.4	55.4	98.4	-4.0	-6.7%	35.5%	52.3%	170.4%
Beyond TA sub-total		**7,442**	**80**	**131**	**124**	**220**	**-7**	**-5.1%**	**59.2%**	**54.9%**	**77.6%**
Total		**10,157**	**109.4**	**178.6**	**167.4**	**297.2**	**-11.3**	**-6.3%**	**100.0%**	**52.9%**	**171.7%**

Expressed in financial years; inflated dollars & including GST

Source: Shopping Centre News; Property Council of Australia; Macroplan

Section 5: Key findings and recommendations

In assessing the scale and mix of retail and non-retail floorspace supportable at the subject site, the following are our key findings and conclusions:

- The trade area population is estimated at 1,770 at mid-2021, and is forecast to reach 3,570 people by 2036, reflecting average annual growth of 1.6% per annum to 2026, 9.5% from 2026 to 2031, and 3.4% from 2031 to 2036.
- The trade area population is generally characterised by slightly younger, overseas born families.
- Total retail expenditure per household, estimated at $31,745 per annum, is 28.4% below the Greater Sydney average. Within this, spend on food and non-food are 24.2% and 34.2% below the respective averages.
- Up to 680 sq.m of retail specialty is supportable at the subject site in 2031, along with supporting non-retail shop provision and a childcare centre. The current planned tenancies all fall within the supportable floorspace estimations.
- The estimated trading impacts arising from the development of the planned retail provision at the subject site on other retailers in the surrounding area are projected to be minor/moderate and are unlikely to threaten their viability.

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9 Albert Street and 31 O'Connell Street, North Parramatta

Site Specific Planning Proposal Noise Impact Assessment

Peterose Pty Ltd

Report number: 240008-31O'Connell St, Nrth Parra-PP Acoustic Assessment-R0
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1 INTRODUCTION

Pulse White Noise Acoustics Pty Ltd (PWNA) has been engaged by Peterose Pty Ltd to undertake an acoustic assessment for the proposed mixed use development located at 31 O'Connell Street and 9 Albert Street, North Parramatta.

This assessment will address the following:

- Potential surrounding environmental noise intrusion impacts on the development (i.e., traffic and other noise external noise sources).
- Noise emissions on nearby receivers from operation of the base building services (i.e., electrical, hydraulic and mechanical plant).
- Noise impact from the proposed commercial tenancies located within the ground floors of the project, including the proposed childcare centre.
- Noise emission on nearby receivers from the movement of vehicles in and out of the site.

This report will discuss the relevant acoustic criteria which have been adopted as well as the outcome of the assessment.

A list of acoustic terminology used in this report is included in Appendix A of this report.

1.1 Relevant Guidelines

Noise intrusion into the development will be controlled by the requirements of the NSW Legislation *State Environmental Planning Policy (Infrastructure)* 2007, NSW Department of Planning *Development Near Rail Corridors and Busy Roads – Interim Guideline 2008 (DNRCBR)* and the objectives of Australian New Zealand Standard *AS/NZS 2107:2016 Acoustics–Recommended design sound levels and reverberation times for building interiors* has been adopted.

Furthermore, the noise emission impacts from the proposed development on the adjacent receivers are regulated by the NSW EPA *Noise Policy for Industry (NPI) 2017*, NSW EPA *Road Noise Policy (RNP) 2011* and the typically imposed NSW Liquor and Gaming acoustic requirements.

1.2 Proposed Development

The proposed development includes the following:

- Three levels of basement areas which will accommodate residential parking, retail parking, back of house areas and building plant area.
- Lower Ground floor and Upper Ground Floors which include commercial and retail tenancies as well as a childcare centre and site loading.
- Levels one through level twenty-one are residential apartments.
- Level 6 will accommodate a rooftop common area.

Architectural drawings for the proposed development, which have been used in our assessment, are include the DKO Architects drawings dated November 2023.

1.3 Site Description

The project site is located on the site at 31 O'Connell Street and 9 Albert Street, North Parramatta which includes an area which is defined as a suburban area which includes exiting though traffic on the surrounding roadways.

The site is located adjacent to O'Connell Street which carries high volume of daily traffic including heavy vehicles.

The south and west of the site includes existing hostel, aged care and residential receivers. All these receivers are assessed as residential receivers in this assessment. Additionally there are existing residential receivers which are opposite the site on Albert Street to the north and O'Connell Street to the east.

The nearest sensitive receivers to the site have been identified below.

Receiver 1: Residential receivers located to the north of the site opposite on Albert Street including 10-16 Albert Street.

Receiver 2: Residential receivers located to the east of the site opposite on O'Connell Street including 56-76 O'Connell Street.

Receiver 3: Southern Cross Care nursing home located to the west of the site, including a residential receiver.

Receiver 4: Hope Hostel located to the west of the site, including a residential receiver.

Receiver 5: Lilian Wells Nursing Home located to the south of the site and including a residential receiver.

A map showing the site location and all measurement locations as well as nearest receivers is provided in Figure 1 below.

Figure 1 Site Map, Measurement Locations and Surrounding Receivers

2 ACOUSTIC NOISE AND VIBRATION SURVEY

This section of the report details the acoustic survey which has been undertaken at the site.

2.1 Onsite Noise Measurements

Measured noise levels from both the unattended and attended noise surveys are outlined below.

2.1.1 Unattended Noise Monitoring

An unattended noise survey was conducted between 11th and 18th March 2022 along the north-eastern corner of the existing building as shown in Figure 1 above. All data in the graphs presented in Appendix B have not been corrected (i.e., raw data presented).

Instrumentation for the survey comprised one Rion NL-42 sound level meter (serial number 00998079). Calibration of the logger was checked prior to and following the measurements. Drift in calibration did not exceed ±0.5 dB. All equipment carried appropriate and current NATA (or manufacturer) calibration certificates. Charts presenting summaries of the measured daily noise data are attached in Appendix B. The charts present each 24-hour period and show the L_{A10}, L_{Aeq} and L_{A90} noise levels for the corresponding 15-minute periods. This data has been filtered to remove periods affected by adverse weather conditions based on weather information.

Based on the unattended noise measurements, the results of the survey have been presented below.

2.1.1.1 Results in accordance with the NSW *EPA Noise Policy for Industry (NPI) 2017* (RBL's)

In order to assess the acoustical implications of the development at nearby noise sensitive receivers, the measured background noise data of the logger was processed in accordance with the NSW EPA's *Noise Policy for Industry* (NPI, 2017). The Rating Background Noise Level (RBL) is the background noise level used for assessment purposes at the nearest potentially affected receiver. It is the 90th percentile of the daily background noise levels during each assessment period, being day, evening and night. RBL $L_{A90\,(15minute)}$ and L_{Aeq} noise levels are presented in Table 1

Data affected by adverse meteorological conditions and by spurious and uncharacteristic events have been excluded from the results, and also excluded from the data used to determine the noise emission criteria. Meteorological information has been obtained from the Sydney Olympic Park AWS (Archery Centre) weather station (ID 066212).

Table 1 Measured Ambient Noise Levels corresponding to the NPI's Assessment Time Periods

Measurement Location	Daytime[1] 7:00 am to 6:00 pm		Evening[1] 6:00 pm to 10:00 pm		Night-time[1] 10:00 pm to 7:00 am	
	L_{A90}[2] (dBA)	L_{Aeq}[3] (dBA)	L_{A90}[2] (dBA)	L_{Aeq}[3] (dBA)	L_{A90}[2] (dBA)	L_{Aeq}[3] (dBA)
Albert Street, North Parramatta – See Figure 1.	47	55	42	53	39	48

Note 1: For Monday to Saturday, Daytime 7:00 am – 6:00 pm; Evening 6:00 pm – 10:00 pm; Night-time 10:00 pm – 7:00 am. On Sundays and Public Holidays, Daytime 8:00 am – 6:00 pm; Evening 6:00 pm – 10:00 pm; Night-time 10:00 pm – 8:00 am

Note 2: The L_{A90} noise level is representative of the "average minimum background sound level" (in the absence of the source under consideration), or simply the background level.

Note 3: The L_{Aeq} is the energy average sound level. It is defined as the steady sound level that contains the same amount of acoustical energy as a given time-varying sound.

Note: Rating background noise levels will be adopted for the project based on the attended noise survey.

2.1.1.2 Results in accordance with the NSW Department of Planning "Development near Rail Corridors and Busy Roads – Interim Guideline"

In determining the required façade construction for the proposed building in accordance with the internal noise level requirements of NSW Department of Planning "Development near Rail Corridors and Busy Roads – Interim Guideline" measured noise levels are shown based on the time periods defined by the SEPP below.

Data affected by adverse meteorological conditions and by spurious and uncharacteristic events have been excluded from the results, and also excluded from the data used to determine the noise emission criteria.

Table 2 Measured Ambient Noise Levels corresponding to the "Development near Rail Corridors and Busy Roads – Interim Guideline" Assessment Time Periods

Measurement Location	Daytime [1] 7:00 am to 10:00 pm	Night-time [1] 10:00 pm to 7:00 am
	L_{Aeq} (whole period) [2] (dBA)	L_{Aeq} (whole period) [2] (dBA)
O'Connell Street	67	66

Note 1: For Monday to Sunday, Daytime 7:00 am – 10:00 pm; Night-time 10:00 pm – 7:00 am.

Note 2: The L_{Aeq} is the energy average sound level. It is defined as the steady sound level that contains the same amount of acoustical energy as a given time-varying sound.

2.1.2 Attended Noise Measurements

In addition to the unattended noise survey, an attended noise survey was carried out to establish levels at key locations within and surrounding the site. These are summarised below.

The attended noise measurements were conducted using a Brüel & Kjær Type 2250 sound level meter (serial number 2709757). Calibration of the sound level meter was checked prior to and following the measurements using a Brüel & Kjær Type 4231 sound calibrator (serial number 3009148). The calibrator emitted a calibration tone of 94 dB at 1 KHz. The drift in calibration did not exceed ±0.5 dB. All equipment carries appropriate and current NATA (or manufacturer) calibration certificates.

Attended noise measurements were undertaken on 12th March 2022 and 18th March 2022. Results of the attended noise measurements are outlined in Table 3 below.

Table 3 Measured Results of the Attended Noise Survey

Measurement Location	Date and Time	Measured Noise Level (dBA)		Comments
		$L_{A90\ (15\text{-}min)}$[1]	$L_{Aeq\ (15\text{-}min)}$[2]	
Location 1: South-east corner of site (see Figure 1)	12th March 2022 between 9:30am to 10:30am	68	63	Noise dominated from traffic movements on surrounding Roadways
Location 2: North wester corner of the site (see Figure 1)		70	66	Noise dominated from traffic movements on surrounding Roadways
Location 3: Corner or O'Connell and Albert Streets		70	67	
Location 1: South-east corner of site (see Figure 1)	Wednesday 21st March 2022 between 8:30pm to 9:30pm	67	63	Noise dominated from traffic movements on surrounding Roadways
Location 2: North wester corner of the site (see Figure 1)		69	66	Noise dominated from traffic movements on surrounding Roadways
Location 3: Corner or O'Connell and Albert Streets		67	66	

Note 1: The L_{A90} noise level is representative of the "average minimum background sound level" (in the absence of the source under consideration), or simply the background level.

Note 2: The L_{Aeq} is the energy average sound level. It is defined as the steady sound level that contains the same amount of acoustical energy as a given time-varying sound.

2.1.3 Calculated L_{Aeq} Noise Levels at Future Facades (Noise Intrusion)

In determining the required construction for the future building envelope, contributing L_{Aeq} noise levels from surrounding roads to each future façade need to be determined. Utilising the 15-minute interval difference between the attended measurement and the unattended monitor as well as the difference between 15-minute interval and overall period result the calculated noise levels at each façade are determined below. Where applicable, angle of view and distance corrections have also been provided.

Table 4 Predicted Noise Level at Future Facades

Prediction Location	Predicted Façade Noise Level $L_{Aeq\ (Period)}$ [2] (dBA)	
	Day time (7:00am-10:00pm)	Night time (10:00pm-7:00am)
	$L_{Aeq\ (Whole\ Period)}$	$L_{Aeq\ (Whole\ Period)}$
Northern Façade (Albert Street)	67	65
Eastern Facade (O'Connell Street)	68	66
Southern Façade	62	61
Western Façade	64	53

Note 1: For Monday to Sunday, Daytime 7:00 am – 10:00 pm; Night-time 10:00 pm – 7:00 am.

Note 2: The L_{Aeq} is the energy average sound level. It is defined as the steady sound level that contains the same amount of acoustical energy as a given time-varying sound.

3 ACOUSTIC CRITERIA

The acoustic criteria which have been adopted for this assessment are outlined below. All criteria have been separated into the relevant assessment type, these are *Noise Intrusion Criteria* (Assessment of building envelope), *Noise Emission Criteria* (Assessment of noise to surrounding receivers) and *Acoustic Separation Criteria* (Assessment of acoustic privacy within the building).

3.1 Noise Intrusion Criteria

External noise intrusion into the building will generally be via the building envelope (External wall, glazing or external roof). The design of the building envelope should be such that the requirements listed below are achieved.

3.1.1 NSW Legislation *"State Environmental Planning Policy (SEPP) (Infrastructure) 2007"*

Clause 102 from the SEPP (Infrastructure) states the following:

> ***102 Impact of road noise or vibration on nonroad development***
>
> 1. *This clause applies to development for any of the following purposes that is on land in or adjacent to the road corridor for a freeway, a tollway or a transitway or any other road with an annual average daily traffic volume of more than 20,000 vehicles (based on the traffic volume data published on the website of TfNSW) and that the consent authority considers is likely to be adversely affected by road noise or vibration-*
>
> 2. *Before determining a development application for development to which this clause applies, the consent authority must take into consideration any guidelines that are issued by the secretary for the purposes of this clause and published in the Gazette.*
>
> 3. *If the development is for the purposes of residential accommodation, the consent authority must not grant consent to the development unless it is satisfied that appropriate measures will be taken to ensure that the following LAeq level are not exceeded-*
>
>   a. *In any bedroom in the residential accommodation – 35dbA at any time between 10pm and 7am.*
>
>   b. *Anywhere else in the residential accommodation (other than a garage, kitchen, bathroom or hallway) – 40dBA at any time.*
>
> 4. *In this clause, freeway, tollway and transitway have same meanings at they have in the Roads Act 1993.*

3.1.2 NSW Department of Planning "Development Near Rail Corridors and Busy Roads – Interim Guideline 2008 (DNRCBR)

NSW Department of Planning's document DNRCBR adopts the same internal noise criteria outlined in the SEPP infrastructure above; see below (note: clause 87 (i.e., rail) is not applicable to this site).

For clauses 87 (rail) and 102 (road):

If the development is for the purpose of a building for residential use, the consent authority must be satisfied that appropriate measures will be taken to ensure that the following LAeq levels are not exceeded:

- *in any bedroom in the building: 35dB(A) at any time 10pm–7am*
- *anywhere else in the building (other than a garage, kitchen, bathroom, or hallway): 40dB(A) at any time.*

3.1.3 Australian / New Zealand Standard AS/NZS 2107:2016 Acoustics - Recommended design sound levels and reverberation times for building interiors - (AS/NZS 2107:2016)

Recommended ambient noise levels and reverberation times for internal spaces are given in a number of publications including Table 1 of Australian / New Zealand Standard 2107:2016 "*Acoustics - Recommended design sound levels and reverberation times for building interiors*". Unlike the previous version of this Standard, this latest edition recommends a range with lower and upper levels (rather than "satisfactory" and "maximum" internal noise levels) for building interiors based on room designation and location of the development relative to external noise sources. This change has occurred due to the fact that sound levels below 'satisfactory' could be interpreted as desirable, but the opposite may in fact be the case. Levels below those which were listed as 'satisfactory' can lead to inadequate acoustic masking resulting in loss of acoustic isolation and speech privacy.

Internal noise levels due to the combined contributions of external noise intrusion and mechanical ventilation plant should not exceed the maximum levels recommended in this Standard. The levels for areas relevant to this development are given in Table 5 below. The mid to maximum points of the internal noise level ranges are generally adopted as the internal design noise criteria for the combined effect of mechanical services and external noise intrusion. In this report we will confine our recommendations to dBA levels, however, where the background noise appears to be unbalanced, AS/NZS 2107:2016 provides direction in terms of suitable diagnostic tools that can be used to assess the spectrum distribution of the background noise.

Table 5 Recommended Design Sound Levels and Reverberation Times

Type of Occupancy/Activity	Design sound level range dBA ($L_{Aeq,t}$)	Project Design Noise Level [1]
Residential Buildings		
Houses and apartments in inner city areas or entertainment districts or near major roads-		
Apartment common areas (e.g foyer, lift lobby)	45 to 50	50 dB(A) $L_{eq\ (24\ hours)}$
Living areas	35 to 45	40 dB(A) $L_{eq\ (24\ hours)}$
Sleeping areas (night time)	35 to 40	35 dB(A) $L_{eq\ (9\ hours\ 10pm\ to\ 7am)}$
Work areas	35 to 40	40 dB(A) $L_{eq\ (24\ hours)}$

Note 1: Overall recommended level for mechanical services noise and intrusive noise, combined.

Section 6.18 of AS/NZ 2107:2016 notes that the presence of discrete frequencies or narrow band signals may cause the sound level to vary spatially within a particular area and be a source of distraction for occupants. Where this occurs, the sound level shall be determined as the highest level measured in the occupied location(s).

If tonal components are significant characteristics of the sound within a measurement time interval, an adjustment shall be applied for that time interval to the measured A-weighted sound pressure level to allow for the additional annoyance. If the background sounds include spectral imbalance, then the RC (Mark II) levels indicated in the Standard should be referenced (see also Appendix D of AS/NZ 2107:2016 for additional guidance).

Generally, where the final noise levels are within +/- 2 dB of the specified level given above, the design criteria will be considered met. Both the upper and lower limits will need to be satisfied especially where privacy is important or where noise intrusion to be avoided.

3.2 Noise Emission Criteria (Operational Criteria)

Noise emissions from the operation of the site impacting on the adjacent land users are outlined below. Noise emissions expected from the use of the site include, basement carpark and associated driveway, mechanical services and communal areas.

3.2.1 NSW EPA Noise Policy for Industry (NPI) 2017

In NSW, the control of noise emissions is the responsibility of Local Governments and the NSW Environment Protection Authority (NSW EPA).

The NSW EPA has recently released a document titled *Noise Policy for Industry* (NSW NPI) which provides a framework and process for determining external noise criteria for the assessment of noise emission from industrial developments. The NSW NPI criteria for industrial noise sources have two components:

- Controlling the intrusive noise impacts for residents and other sensitive receivers in the short term; and
- Maintaining noise level amenity of particular land uses for residents and sensitive receivers in other land uses.

3.2.1.1 Intrusive Noise Impacts (Residential Receivers)

The NSW NPI states that the noise from any single source should not intrude greatly above the prevailing background noise level. Industrial noises are generally considered acceptable if the equivalent continuous (energy-average) A-weighted level of noise from the source (L_{Aeq}), measured over a 15-minute period, does not exceed the background noise level measured in the absence of the source by more than 5 dB(A). This is often termed the Intrusiveness Criterion.

The 'Rating Background Level' (RBL) is the background noise level to be used for assessment purposes and is determined by the methods given in the NSW NPI. Using the rating background noise level approach results in the intrusiveness criterion being met for 90% of the time. Adjustments are to be applied to the level of noise produced by the source that is received at the assessment point where the noise source contains annoying characteristics such as tonality or impulsiveness.

3.2.1.2 Protecting Noise Amenity (All Receivers)

To limit continuing increase in noise levels, the maximum ambient noise level within an area from industrial noise sources should not normally exceed the acceptable noise levels specified in Table 2.2 of the NSW NPI. That is, the ambient L_{Aeq} noise level should not exceed the level appropriate for the particular locality and land use. This is often termed the 'Background Creep' or Amenity Criterion.

The amenity assessment is based on noise criteria specified for a particular land use and corresponding sensitivity to noise. The cumulative effect of noise from industrial sources needs to be considered in assessing the impact. These criteria relate only to other continuous industrial-type noise and do not include road, rail or community noise. If the existing (measured) industrial-type noise level approaches the criterion value, then the NSW NPI sets maximum noise emission levels from new sources with the objective of ensuring that the cumulative levels do not significantly exceed the criterion.

Project amenity noise level for industrial developments is specified as the recommended amenity noise level (Table 2.2 of the NPI) minus 5 dB(A). To standardise the time periods for the intrusiveness and amenity noise levels, this policy assumes that the $L_{Aeq,15min}$ will be taken to be equal to the $L_{Aeq,period}$ + 3 decibels (dB).

Where the resultant project amenity noise level is 10 dB or more lower than the existing traffic noise level, the project amenity noise levels can be set at 15 dB below existing traffic noise levels (i.e. *LAeq,period(traffic) minus 15 dBA*).

3.2.1.2.1 Area Classification

The NSW NPI characterises the "Residential Suburban" noise environment as an area that has the following characteristics:

- An acoustical environment that:
    - has through-traffic with characteristically heavy and continuous flows during peak periods
    - has any combination of the above.

For residential and non-residential receivers in an residential suburban area, the recommended amenity criteria are shown in Table 6 below.

Table 6 NSW NPI – Recommended L_{Aeq} Noise Levels from Noise Sources

Type of Receiver	Indicative Noise Amenity Area	Time of Day[1]	Recommended Amenity Noise Level ($L_{Aeq, period}$)[2] (dBA)
Residence	Suburban	Day	55
		Evening	45
		Night	40
Commercial		When in use	65

Note 1: For Monday to Saturday, Daytime 7:00 am – 6:00 pm; Evening 6:00 pm – 10:00 pm; Night-time 10:00 pm – 7:00 am. On Sundays and Public Holidays, Daytime 8:00 am – 6:00 pm; Evening 6:00 pm – 10:00 pm; Night-time 10:00 pm – 8:00 am.

Note 2: The L_{Aeq} is the energy average sound level. It is defined as the steady sound level that contains the same amount of acoustical energy as a given time-varying sound.

3.2.1.3 Project Trigger Noise Levels

The intrusive and amenity criteria for industrial noise emissions, derived from the measured data, are presented in Table 7. These criteria are nominated for the purpose of determining the operational noise limits for mechanical plant associated with the development which can potentially affect noise sensitive receivers.

For each assessment period, the lower (i.e., the more stringent) of the amenity or intrusive criteria are adopted, which are shown in bold text in Table 7.

Table 7 External noise level criteria in accordance with the NSW NPI

Location	Time of Day [1]	Project Amenity Noise Level, $L_{Aeq,\ period}$ [2] (dBA)	Measured $L_{A90,\ 15\ min}$ (RBL) [3] (dBA)	Measured $L_{Aeq,\ period}$ Noise Level (dBA)	Intrusive $L_{Aeq,\ 15\ min}$ Criterion for New Sources (dBA)	Amenity $L_{Aeq,\ 15\ min}$ Criterion for New Sources (dBA)
Residences	Day	50	47	55	**52**	53
	Evening	40	42	53	47	**43**
	Night	35	39	48	44	**38**
Commercial	When in use	60	-	-	-	**63**

Note 1: For Monday to Saturday, Daytime 7:00 am – 6:00 pm; Evening 6:00 pm – 10:00 pm; Night-time 10:00 pm – 1:00 am. On Sundays and Public Holidays, Daytime 8:00 am – 6:00 pm; Evening 6:00 pm – 10:00 pm; Night-time 10:00 pm – 1:00 am.

Note 2: Project Amenity Noise Levels corresponding to "Suburban" areas, equivalent to the Recommended Amenity Noise Levels minus 5 dBA.

Note 3: L_{A90} Background Noise or Rating Background Level.

Note 4: Project Noise Trigger Levels are shown in bold.

Note 5: Where the resultant project amenity noise level is 10 dB or more lower than the existing traffic noise level or traffic levels are the dominant source, the project amenity noise levels can be set at 15 dB below existing industrial noise levels.

Note 6: According to Section 2.2 of the NSW NPI, the $L_{Aeq,\ 15\ minutes}$ is equal to the $L_{Aeq,\ period}$ + 3 dB.

3.3 Acoustic Separation Criteria

3.3.1 National Construction Code (NCC) / Building Code of Australia (BCA) 2019

The Building Code of Australia (BCA) is a uniform set of technical provisions for the design and construction of buildings and other structures throughout Australia. The BCA is produced and maintained by the Australian Building Codes Board (ABCB) and given legal effect through the Building Act 1975. The National Construction Code (NCC) comprises the Building Code of Australia and the Plumbing Code of Australia (the Plumbing Code of Australia is given legal effect through the Plumbing and Drainage Act 2002 (Qld)) and is published in three volumes. Volumes one and two relate to the BCA.

Part F7 of the 2022 BCA / NCC provides the Sound Transmission and Insulation requirements for Class 2 or 3 buildings. A summary of the acoustic requirements of the NCC 2022 for Class 2 or 3 buildings is given in Table 8 below.

Table 8 NCC 2019 Sound Insulation Requirements

Construction	2019 NCC	
	Laboratory performance requirements	Verification method
Walls between sole occupancy units	$R_w + C_{tr}$ not < 50	$D_{nT,w} + C_{tr}$ not < 45
Walls between a bathroom, sanitary compartment, laundry or kitchen in one sole occupancy unit and a habitable room (other than a kitchen) in an adjoining unit	$R_w + C_{tr}$ not < 50 and Must have a minimum 20 mm cavity between two separate leaves	$D_{nT,w} + C_{tr}$ not < 45 "Expert Judgment" Comparison to the "Deemed to satisfy" Provisions
Walls between sole occupancy units and a plant room or lift shaft	R_w not < 50 and Must have a minimum 20 mm cavity between two separate leaves[1]	$D_{nT,w}$ not < 45
Walls between sole occupancy units and a stairway, public corridor, public lobby or the like, or parts of a different classification	R_w not < 50	$D_{nT,w}$ not < 45
Door assemblies located in a wall between a sole-occupancy unit and a stairway, public corridor, public lobby or the like	R_w not < 30 [2]	$D_{nT,w}$ not < 25
Floors between sole-occupancy units or between a sole-occupancy unit and a plant room, lift shaft, stairway, public corridor, public lobby or the like, or parts of a different classification	$R_w + C_{tr}$ not < 50 $L_{n,w}$ not > 62	$D_{nT,w} + C_{tr}$ not < 45 $L'_{nT,w}$ not > 62
Soil, waste, water supply and stormwater pipes and ductwork to habitable rooms	$R_w + C_{tr}$ not < 40	n/a
Soil, waste, water supply and stormwater pipes and ductwork to kitchens and other rooms	$R_w + C_{tr}$ not < 25	n/a
Intra-tenancy Walls	There is no statutory requirement for airborne isolation via intra-tenancy walls.	

Note 1: A wall must be of "discontinuous construction" if it separates a sole occupancy unit from a plant room or lift shaft. Clause F5.3(c) defines "discontinuous construction" as a wall having a minimum 20mm cavity between two separate leaves with no mechanical linkage except at the periphery.

Note 2: Clause FP5.3(b) in the 2016 BCA states that the required insulation of a floor or wall must not be compromised by a door assembly.

Note 3: Masonry walls must be laid with all joints filled solid, including those between the masonry and any adjoining construction

4 ACOUSTIC ASSESSMENT

In addressing all of the criteria which are shown above, each component of the development is assessed and presented below.

4.1 Summary of Measured/Predicted Noise Level and Building Envelope Acoustic Criteria

The results of the monitoring that provides the façade noise levels of the proposed building are presented in Table 4. The relevant noise intrusion criterion for land-based noise intrusion sources are summarised in Table 9 below together with the monitored external noise levels and the predicted noise levels on the northern, eastern, southern and western building facades.

Table 9 Summary of Facade Noise Levels and Relevant Assessment Criteria

Facade Location	Document/ Guideline/ Standard	Day Time [1 2] (dBA)	Night Time [1 2] (dBA)
		$L_{Aeq\ (Whole\ Period)}$	$L_{Aeq\ (Whole\ Period)}$
Measured/Predicted Noise Levels			
Northern Facade (Albert Street)		67	65
Eastern Facade (O'Connell Street)		68	66
Southern Façade		62	61
Western Façade		64	53

Note 1: For Monday to Sunday, Daytime 7:00 am – 10:00 pm; Night-time 10:00 pm – 7:00 am.

Note 2: For internal noise level criteria which are presented as a range, compliance is determined based on the highest level in the range.

4.2 Building Envelope Assessment

4.2.1 Glazing Recommendations

The recommended sound transmission loss requirement required to satisfy the specified internal noise level criteria outlined above are summarised in Table 10.

Table 10 External Façade Elements Recommendations

Location	Levels	Spaces	Minimum Glazing System Rating Requirements [1]	Indicative Construction [1]
Northern Façade (Facing Albert Street)	All levels	Bedroom	Rw (C;Ctr): 35 (0;-3)	10.38mm Laminated
		Living Area	Rw (C;Ctr): 35 (0;-3)	10.38mm Laminated
		Commercial	Rw (C;Ctr): 35 (0;-3)	10.38mm Laminated
		Wet areas	Rw (C;Ctr): 30 (0;-3)	6.38mm Laminated
Eastern Facade (Facing O'Connell Street)		Bedroom	Rw (C;Ctr): 37 (0;-3)	12.38mm Laminated
		Living Area	Rw (C;Ctr): 37 (0;-3)	12.38mm Laminated
		Commercial	Rw (C;Ctr): 35 (0;-3)	10.38mm Laminated
		Wet areas	Rw (C;Ctr): 30 (0;-3)	6.38mm Laminated
Southern Façade		Bedroom	Rw (C;Ctr): 35 (0;-3)	10.38mm Laminated
		Living Area	Rw (C;Ctr): 35 (0;-3)	10.38mm Laminated
		Commercial	Rw (C;Ctr): 30 (0;-3)	6.38mm Laminated
		Wet areas	Rw (C;Ctr): 30 (0;-3)	6.38mm Laminated
Western Façade		Bedroom	Rw (C;Ctr): 35 (0;-3)	6.38mm Laminated
		Living Area	Rw (C;Ctr): 35 (0;-3)	6.38mm Laminated
		Commercial	Rw (C;Ctr): 30 (0;-3)	6.38mm Laminated
		Wet areas	Rw (C;Ctr): 30 (0;-3)	6.38mm Laminated

Note 1: These are preliminary selections will be confirmed in the detailed design stage once the layouts and façade orientations are approved.

Note 2: All other currently documented glazed façade area are recommended to either be

Note 3: Recommended constructions are also provided for the control of noise emissions from communal areas to adjacent receivers.

Please note for windows, this performance is not only subject to the glazing selection but also to the construction of the window frame and the frame seal selection. Therefore, it is recommended that the window manufacturer should confirm that the required sound insulation can be achieved. It is anticipated that the window system should comprise Q-Lon (or equivalent) or fin seals with deep C channels as part of the window track (i.e., Performance levels outlined above need to be achieved with glazed panels + frame + seals).

4.2.2 External Wall Construction

External wall constructions will be constructed either from masonry/concrete or a lightweight cladding system. For the external walls which are constructed from a masonry/concrete construction, no further acoustic upgrading is required.

However, for the external walls constructed from a lightweight cladding system, the following construction is recommended.

Table 11 Recommended Light Weight External Wall Construction

Façade	Occupancy Area [1]	External Lining	Studwork System	Internal Lining
Northern Façade (facing Albert Street)	All Areas	Architectural Cladding + 1 x 9mm Fibre Cement Sheeting	Minimum 92mm Steel Studwork + 75mm thick 14kg/m³ glasswool insulation	13mm Standard Plasterboard OR 1 x 9mm Fibre Cement Sheeting
Southern Façade				
Western Façade				
Eastern Facade (Facing O'Connell Street)		Architectural Cladding + 1 x 9mm Fibre Cement Sheeting	Minimum 92mm Steel Studwork + 75mm thick 14kg/m³ glasswool insulation	2x 13mm Standard Plasterboard OR 1 x 9mm Fibre Cement and 1x13mm pasteboard Sheeting

Note 1: Recommended constructions are identical for each level.

Note 2: These are preliminary selections will be confirmed in the detailed design stage once the layouts and façade orientations are approved.

All façade elements constructed from masonry or concrete construction will not require additional acoustic treatments to ensure internal noise levels are achieved.

Any penetrations through any external skin which are required must ensure all gaps remaining in the penetration are filled with an acoustic grade sealant which provides an equal or better performance to the system being penetrated.

4.2.3 External Roof Construction

External roofs will be constructed from a concrete construction. In the event the external roof is constructed from a concrete construction, no further acoustic upgrading is required. If penetrations through any external skin are required, all gaps remaining in the penetration are to be filled with an acoustic grade sealant which provides an equal or better performance to the system being penetrated.

4.3 Noise from Engineering Services

At this stage of the project, the exact locations of key plant items have not been selected, and/or the selection of items to be installed. As such, a detailed assessment of noise associated with engineering services cannot be undertaken.

However, to ensure that future selections of plant items meet external noise levels at neighbouring properties a proof-of-concept approach has been considered.

In our experience, for this type of development the following mechanical systems would be installed, and their associated sound power levels are outlined below.

- Basement Exhaust fans – 85dBA (Lw)
- Air conditioning condensers – 70dBA (Lw)
- Apartment toilet or kitchen ventilation fans – 55dBA (Lw)

It is anticipated that basement ventilation fans will discharge on roof level utilising an inline fan. It is recommended that internally lined ductwork or inline attenuators are used on both the intake and discharge side of the fan. On this assumption, compliance would be achieved.

Air conditioning condensers are proposed to be installed on the roof level. Based on a typical sound power level of a condenser unit, the following acoustic treatments are recommended to be installed.

- Condenser plant are to be isolated from the base building structure with a rubber pad.
- Night operation mode must be in operation between 9:00pm and 7:00am and provide a minimum of 4-5dBA.
- Screening to roof top plant and equipment may be required, details to be provided once detailed selections are undertaken as part of the design stage of the project.

For apartment ventilation fans exhausting air from kitchen rangehoods or bathrooms/ensuites/laundries these will be individually discharging on apartment balconies. To ensure compliance the following is recommended:

- Ventilation plant are to be isolated from the base building structure with a vibration isolation include rubber or neoprene pads.

4.4 Noise Impacts on Surrounding Roadways

Noise impacts from the increase in vehicle movements on surrounding roadways including O'Connell Street t othe east and Albert Street to the north are to be assessed in accordance with the NSW EPA Road Noise Policy (RNP) 2011.

A peak hour increase proposed for the number vehicles associated with the development will not exceed a 2dBA increase at a residential receiver as summarised in the NSW EPA RNP to be barely perceptible to the average person and therefore considered acoustically acceptable.

4.5 Childcare Centre – Activity Noise Assessment

This section of the report details the assessment of activity noise levels generated from the proposed child care centre which is to be located on ground floor level of the proposed development, including the use of the internal and external areas for play.

The proposed childcare centre is to be located on the ground floor of the development, and includes the area as detailed in the figure below.

Figure 2 Location of the Proposed Childcare Centre

The proposed childcare centre is located with the outdoor play area which will be adjacent to neighbouring areas which include outdoor common areas to the east and a pedestrian link to the north.

This assessment includes the potential for noise emissions from the use of the childcare centre to the following locations:

1. Residential receivers neighbouring the site, including those to the west of the site and detail in Figure 1 of this report above.
2. Future residential receivers located within the building and located on the levels above.

The AAAC *Guideline for Child Care Centre Acoustic Assessment Version 3* includes recommendations for the assessment of noise levels from the use of play areas impacting on neighbouring residential receivers. The AAAC includes the following:

> **Background Greater Than 40 dB(A)** – The contributed $L_{eq,15min}$ noise level emitted from an outdoor play and internal activity areas shall not exceed the background noise level by more than 5 or 10 dB at the assessment location, depending on the usage of the outdoor play area. AAAC members regard that a total time limit of approximately 2 hours outdoor play per morning and afternoon period should allow an emergence above the background of 10 dB (ie background +10 dB if outdoor play is limited to 2 hours in the morning and 2 hours in the afternoon).
>
> **Up to 4 hours (total) per day** – If outdoor play is limited to no more than 2 hours in the morning and 2 hours in the afternoon, the contributed $L_{eq,15\ minute}$ noise level emitted from the outdoor play shall not exceed the background noise level by more than 10 dB at the assessment location.
>
> **More than 4 hours (total) per day** – If outdoor play is not limited to no more than 2 hours in the morning and 2 hours in the afternoon, the contributed $L_{eq,15\ minute}$ noise level emitted from the outdoor play area shall not exceed the background noise level by more than 5 dB at the assessment location.

As the proposed childcare centre will use external areas of the centre for more than 2 hours per day the suitable noise level emission criteria is background noise + 5 dB(A). The relevant noise level criteria for the use of the childcare centre is detailed in the table below.

Table 12 Noise Emission Criteria for Activity Noise on the site

Location	Time of Day	Measured $L_{A90,\ 15\ min}$ (dBA) Representative Background Noise Level	Intrusive $L_{Aeq,\ 15\ min}$ Criterion for New Sources (dBA)
Residential Receivers	Day time periods	47	50

This section of the report details the activity noise assessment which has been undertaken for the proposed childcare centre. The assessment has been undertaken based on the following:

1. The centre is operational to maximum capacity based on the proposed operation of the internal and external areas of the centre.
2. All areas of the centre including the internal and external areas are in use simultaneously.
3. All recommended acoustic treatments and controls detailed in this report are included in the construction and operation of the site.
4. Noise level generated are based on the source noise levels of the AAAC for external play areas and internal noise levels are based on experience of similar operational facilities operating at maximum capacity. Details of the source noise levels used in this assessment are detailed in the following table.

Table 13 Activity Source Noise Levels

Location	Play Type	Age Group	Source Noise Level
Internal play areas	Normal maximum levels	All Ages	Up to 70 dB(A) Sound Pressure Level
External Play Areas	Active Play[1] For groups of 10 children	0-2	78 dB(A) Sound Power Level
		2-3	85 dB(A) Sound Power Level
		3-6	87 dB(A) Sound Power Level
	Passive Play[2] For groups of 10 children	0-2	77 dB(A) Sound Power Level
		2-3	83 dB(A) Sound Power Level
		3-6	84 dB(A) Sound Power Level

Notes: 1 – Active play include areas where children can actively play and generate noise levels such as running, playing with movable items (scooters and the like). Active play noise levels are based on the medium noise level presented in the AAAC guideline.

2 – Passive play includes areas where play will include less active play such as a sand pit, use of tables and the like where play includes activities do not include moving around and hence a lower noise level results. Passive play noise levels are based on the lower range detailed within the AAAC guideline.

The AAAC *Guideline for Child Care Centre Acoustic Assessment Version 3* includes the effective sound power levels of children which have been used in this report (as detailed above), including the following:

Table 1 provides recommended sound power levels for lots of 10 children, within the different age groupings, along with a recommended source height.

Table 1 – Effective Sound Power Levels ($L_{Aeq,\ 15min}$) for Groups of 10 Children Playing

Number and Age of Children	Sound Power Levels [dB] at Octave Band Centre Frequencies [Hz]								
	dB(A)	63	125	250	500	1k	2k	4k	8k
10 Children - 0 to 2 years	78	54	60	66	72	74	71	67	64
10 Children - 2 to 3 years	85	61	67	73	79	81	78	74	70
10 Children - 3 to 5 years	87	64	70	75	81	83	80	76	72

Notes:
1 If applicable, an adjustment to the above sound power levels of -6 dB could be applied in each age group for children involved in passive play.
2 For simplicity, based upon a review of World Health Organization (WHO) data, a single recommended source height of 1metre is suggested as the source heights.

4.5.1.1 Recommended Acoustic Treatments and Controls

This section of the report details the required acoustic treatments and controls required for the proposed childcare centre to ensure noise emissions comply with the noise level criteria detailed in this report at the neighbouring property boundaries and the future residential receivers located on the levels above within the proposed development.

The required acoustic treatments and controls include the following:

1. All plant and equipment to be used on the site is required to be assessed as part of the CC/design stage of the project. Suitable acoustic treatments are to be specified to ensure noise emission criteria detailed in this report are achieved. Treatments may include lined ductwork, acoustic silencers, time control switches, variable speed drives, acoustic screens or the like.

2. The management of active and passive play is to be undertaken to include the following:

    a. Active play to be located to the eastern portion of the external play area and below the required acoustic cover detailed in the point below.

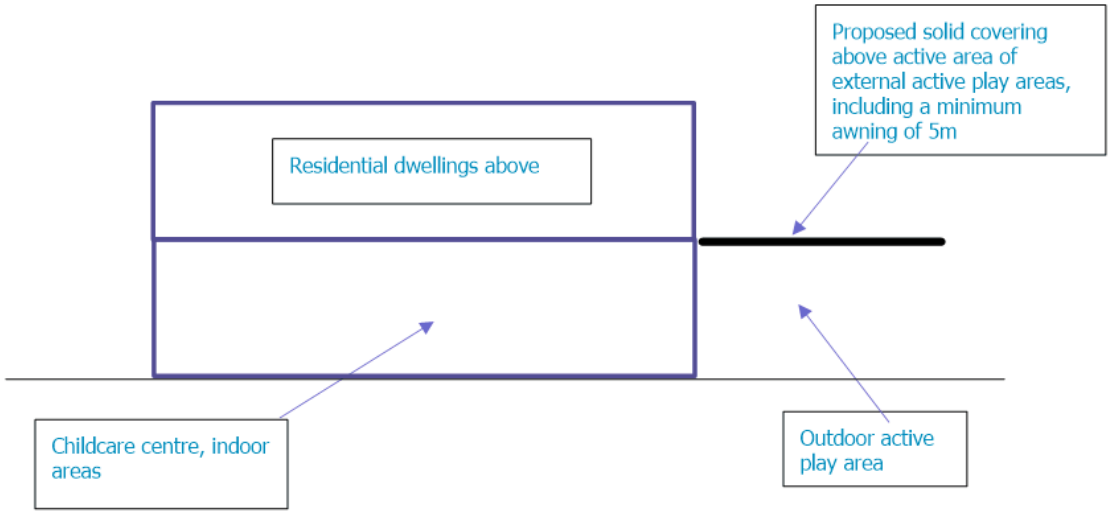
    b. Passive play areas including areas located to the west of the external play area and not located under the building overhang.

3. A solid acoustic cover is required to be installed to the areas where active play is proposed to the courtyard play space. The cover is required to be constructed from a solid material such as 9mm FC sheet, metal deck, 1.38mm laminated glass or other solid building construction with a minimum Rw of 30. It is recommended that the external cover should include a mix of glass / transparent and solid construction including approximately 50% of each.

4. The external cover should include a mix of glass and solid construction including approximately 50% of each.

5. An acoustically absorptive material is to be installed to the underside of the solid external cover (detailed in the points above). The material is to include a minimum acoustic performance of NRC no less than 0.60 and can include surface finishes or spray on materials.

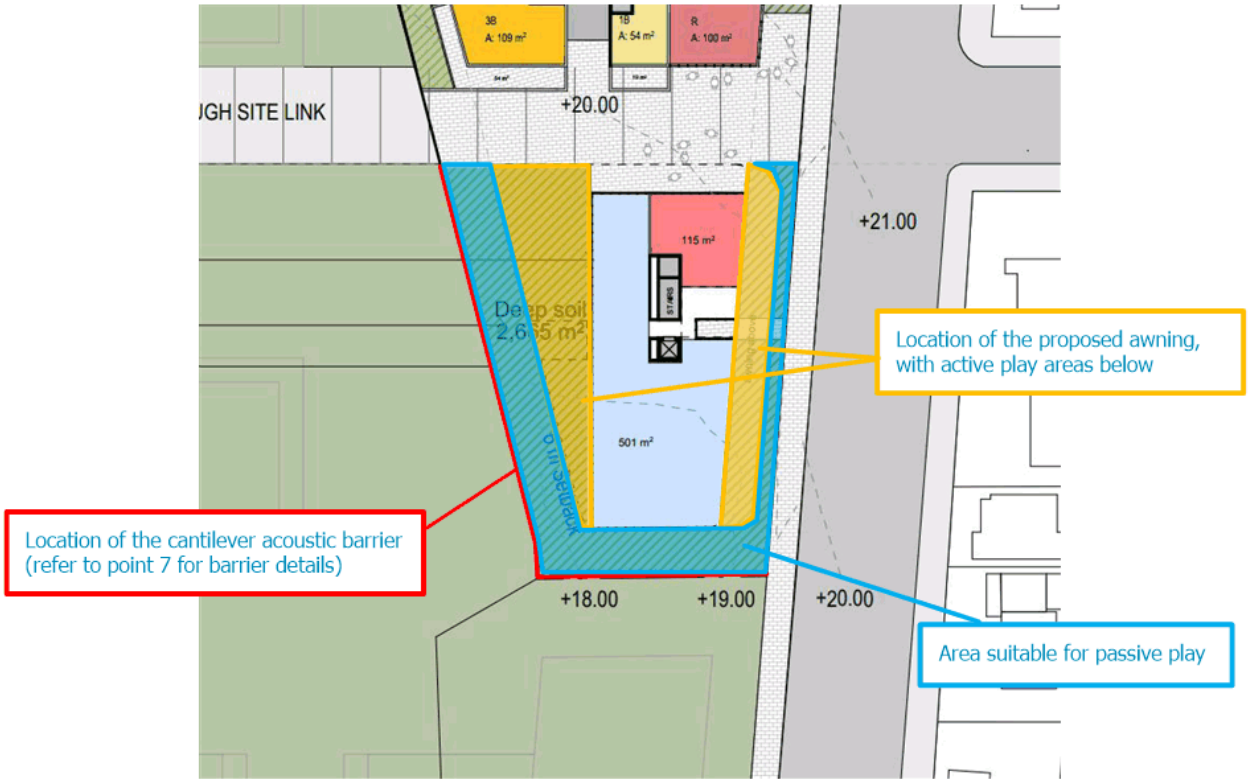
6. A summary of the recommended treatment above is included in the figures below.

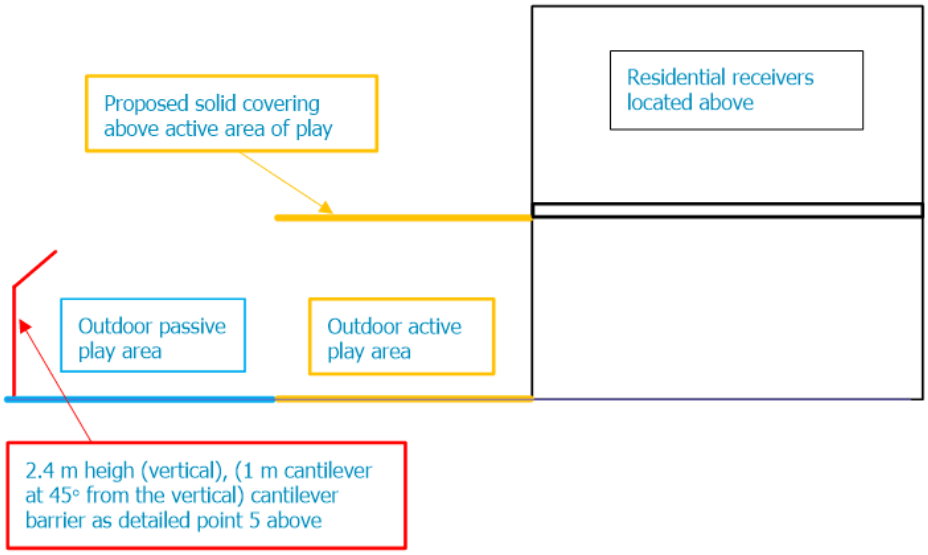


7. A cantilever acoustic barrier is required along the perimeter of the deep soil passive play area (see Figure 3 below). The cantilever barrier should have a vertical height of at least 2.4 m, with an additional cantilever extension of ~1 m, at an angle of ~45° to the vertical. The cantilever acoustic barrier should be constructed from a solid material and can include masonry, 9 mm FC sheet, Hebel, sheet metal, 10.38 mm glass or 10 mm Perspex, or the like.

8. A summary of the recommended treatment above is included in the figures below.

Figure 3 Active / Passive Play Areas





9. All glass openings within the façade of the internal elements of the childcare centre are to include a minimum 10.38 mm laminated glass with a minimum acoustic performance of Rw 35.
10. All openable glazing is to be closed during periods of play or high noise generating activities.
11. All external play areas are to include supervision when used by children by a childcare operator.
12. No outdoor play to occur on the site after 7pm.
13. Details of a suitable site contact should be included a street frontage of the centre where complaints regarding the operation of the centre can be directed.

Providing the recommended treatments included above are the design and operation of the proposed childcare centre the resulting noise emissions will comply with the relevant noise emissions criteria and result in a suitable acoustic amenity to the exiting residential receivers as well as future residential receivers surrounding the centre.

5 CONCLUSION

Pulse White Noise Acoustics Pty Ltd (PWNA) has been engaged by Peterose Pty Ltd to undertake an acoustic assessment for the planning proposal for the residential development located at 31 O'Connell Street and 9 Albert Street, North Parramatta.

As part of this assessment, we have undertaken a review of the building envelope and noise emissions from the use of the site. From this assessment we note the following:

- Minimum acoustic performances and associated indicative constructions for the building envelope have been provided in section 4.2 of this report. The recommended treatments have been provided to ensure compliance with the objectives presented in 3.1.
- To control noise impacts at external receivers, recommended indicative treatments for major engineering services have been provided in section 4.3. From our review we have formulated the following opinion:
    - At this stage of the project the exact selections/locations of plant items are not known. A preliminary assessment, however, has been carried out using our experience with similar types of developments and the typical plant items installed in each type of plant room.
    - From this review we recommend the selection of high-performance acoustic treatment to ensure that the operation of the plant items comply with the project criteria. Therefore, it is recommended that prior to the issue of a Construction Certificate (CC) a detailed acoustic assessment is undertaken to ensure all cumulative noise from engineering services (including the roof plant room) comply with the requirements as listed in section 3.2.
- An assessment of noise resulting from the operation of the proposed childcare centre has been undertaken and details include to mitigate noise impacts from the centre to the existing residential receivers as well as the future dwellings within the project.
- An assessment of the impacts associated with number of vehicles on surrounding public roads around the site and the impact is less than 2dBA and therefore is compliant with the NSW EPA RNP.

Based on the acoustic assessment of the proposed development to the proposed residential provided will be acidotically acceptable.

For any additional information please do not hesitate to contact the person below.

Regards

BG White

Ben White
Director
PULSE WHITE NOISE ACOUSTICS PTY LTD

APPENDIX A: ACOUSTIC GLOSSARY

The following is a brief description of the acoustic terminology used in this report:

Ambient Sound	The totally encompassing sound in a given situation at a given time, usually composed of sound from all sources near and far.
Audible Range	The limits of frequency which are audible or heard as sound. The normal ear in young adults detects sound having frequencies in the region 20 Hz to 20 kHz, although it is possible for some people to detect frequencies outside these limits.
Character, acoustic	The total of the qualities making up the individuality of the noise. The pitch or shape of a sound's frequency content (spectrum) dictate a sound's character.
Decibel [dB]	The level of noise is measured objectively using a Sound Level Meter. The following are examples of the decibel readings of every day sounds; 0dB the faintest sound we can hear 30dB a quiet library or in a quiet location in the country 45dB typical office space. Ambience in the city at night 60dB Martin Place at lunch time 70dB the sound of a car passing on the street 80dB loud music played at home 90dB the sound of a truck passing on the street 100dB the sound of a rock band 115dB limit of sound permitted in industry 120dB deafening
dB(A)	*A-weighted decibels* The ear is not as effective in hearing low frequency sounds as it is hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter. The sound pressure level in dB(A) gives a close indication of the subjective loudness of the noise.
Frequency	Frequency is synonymous to *pitch*. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Loudness	A rise of 10 dB in sound level corresponds approximately to a doubling of subjective loudness. That is, a sound of 85 dB is twice as loud as a sound of 75 dB which is twice as loud as a sound of 65 dB and so on
LMax	The maximum sound pressure level measured over a given period.
LMin	The minimum sound pressure level measured over a given period.
L1	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L10	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
L90	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L_{90} noise level expressed in units of dB(A).
Leq	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.
dB (A)	'A' Weighted overall sound pressure level
Sound Pressure Level, LP dB	A measurement obtained directly using a microphone and sound level meter. Sound pressure level varies with distance from a source and with changes to the measuring environment. Sound pressure level equals 20 times the logarithm to the base 10 of the ratio of the rms sound pressure to the reference sound pressure of 20 micro Pascals.
Sound Power Level, Lw dB	Sound power level is a measure of the sound energy emitted by a source, does not change with distance, and cannot be directly measured. Sound power level of a machine may vary depending on the actual operating load and is calculated from sound pressure level measurements with appropriate corrections for distance and/or environmental conditions. Sound power levels is equal to 10 times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power of 1 picoWatt

APPENDIX B: UNATTENDED NOISE MONITORING RESULTS

Weather Station: Sydney Olympic Park AWS (Archery Centre)

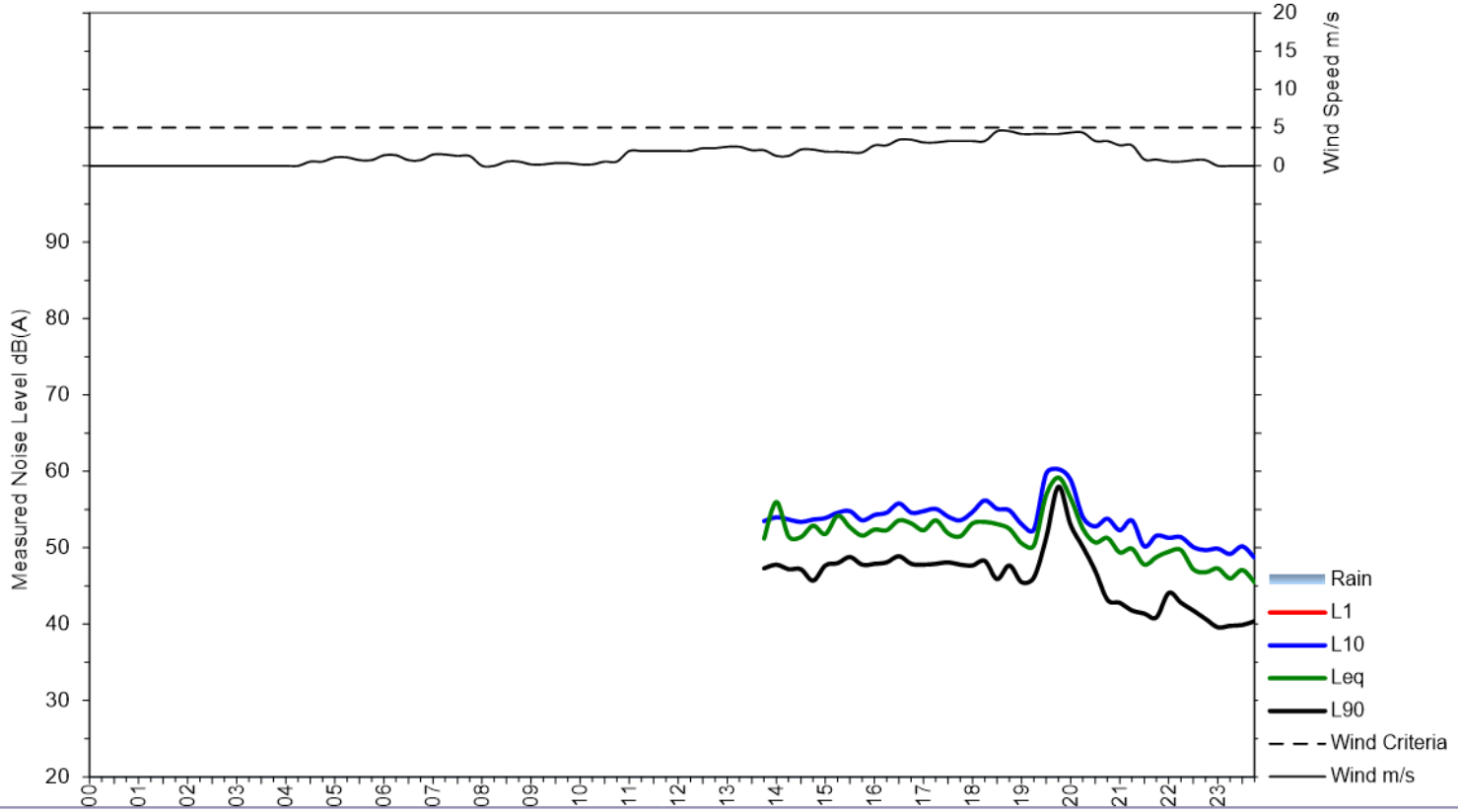
Weather Station ID: 066212

Co-ordinates: Lat: 33.8338°S, Lon: 151.0718°E, Height: 4m AMSL

Figure B-1 Photo of Unattended Noise Monitor Location

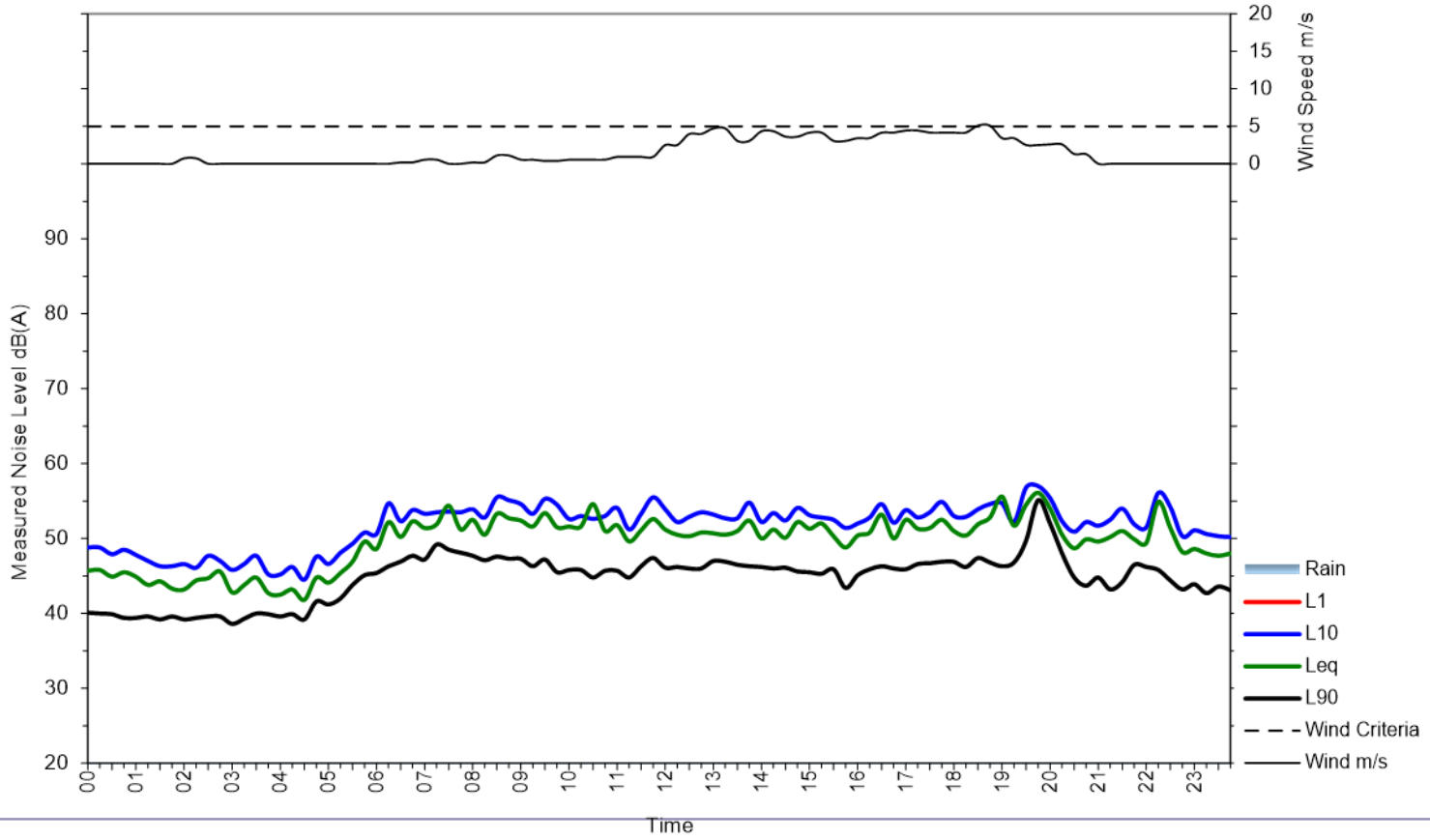
31O'Connell and 9 Albert Street, North Parramatta

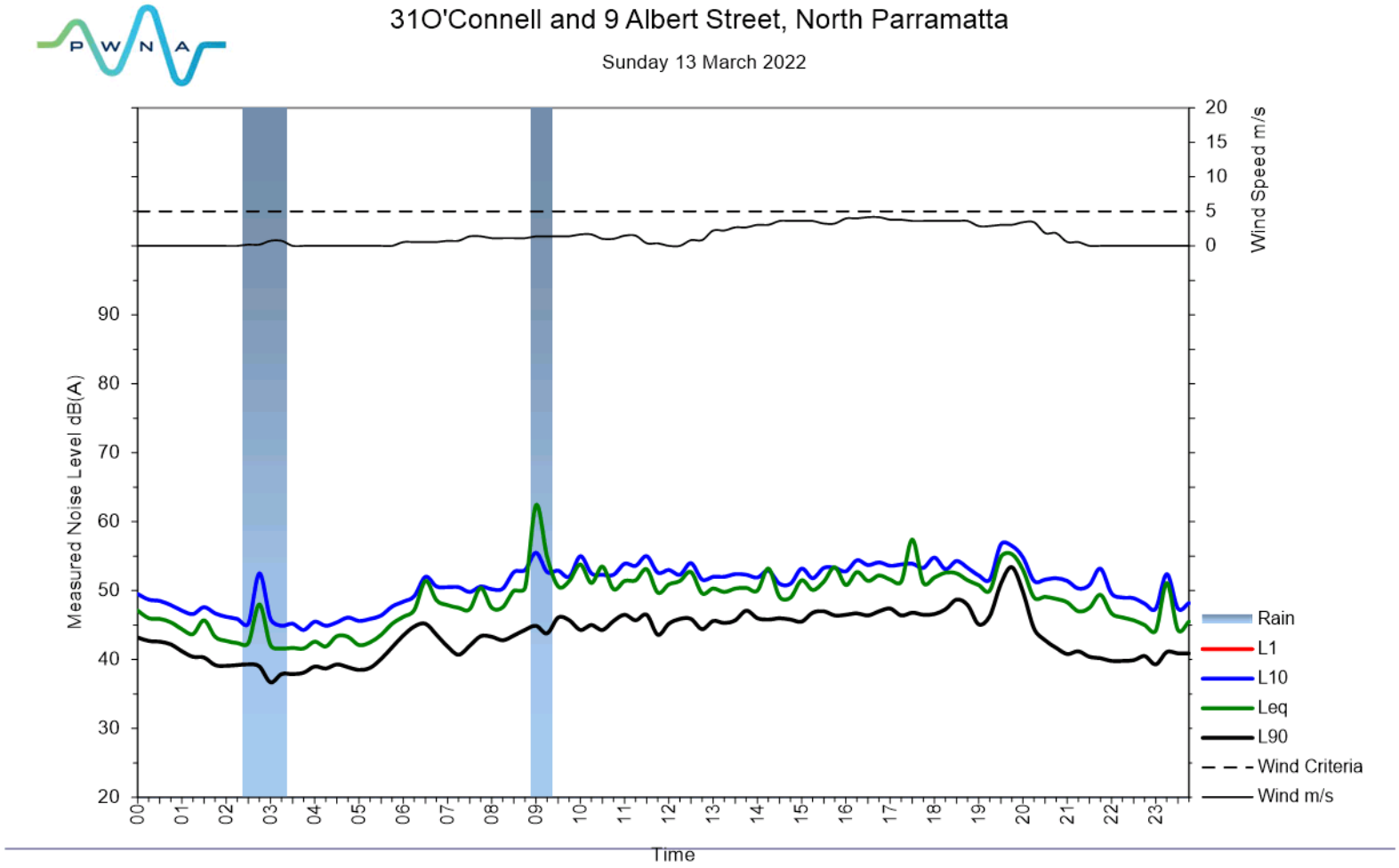
Friday 11 March 2022

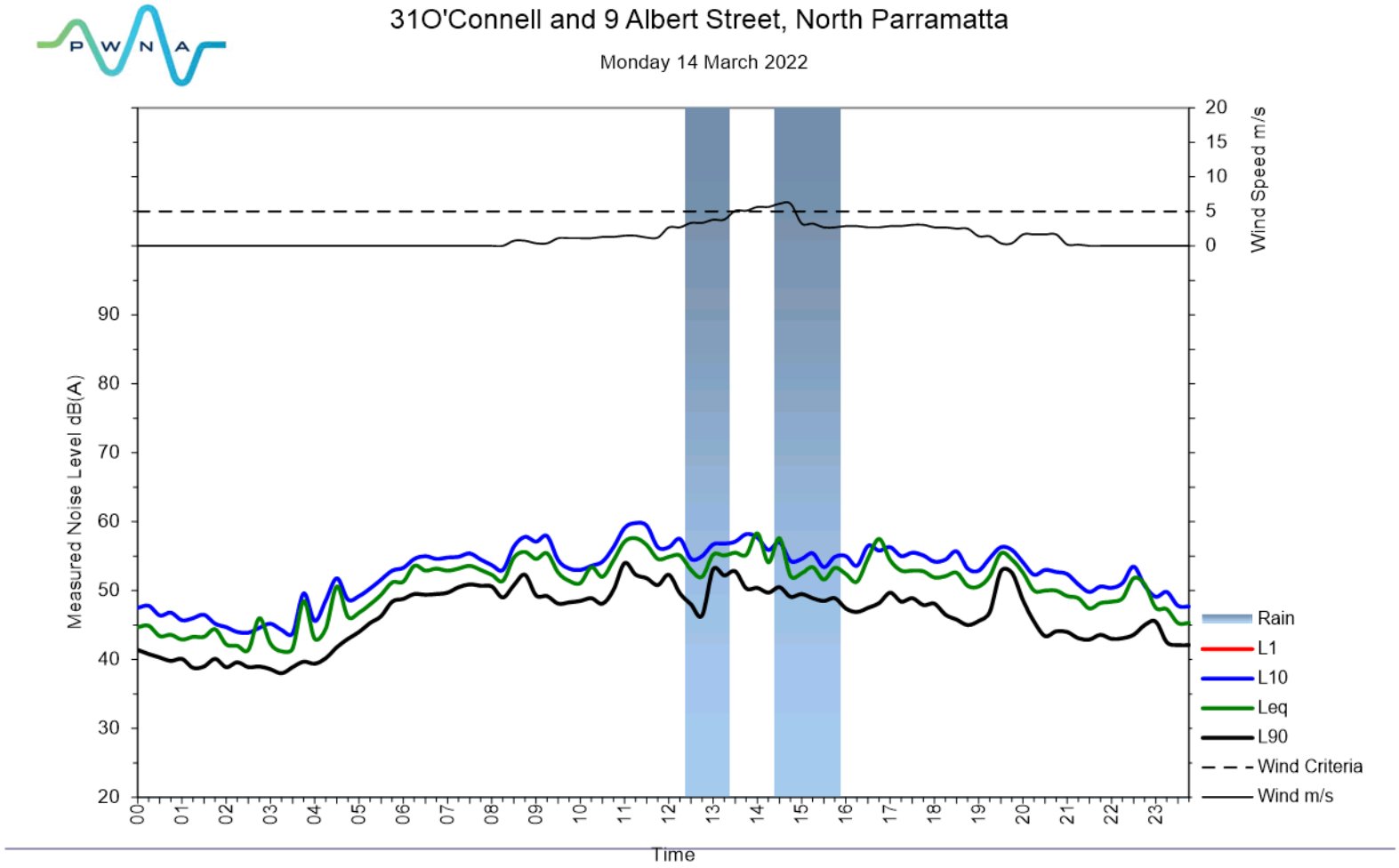


31O'Connell and 9 Albert Street, North Parramatta

Saturday 12 March 2022

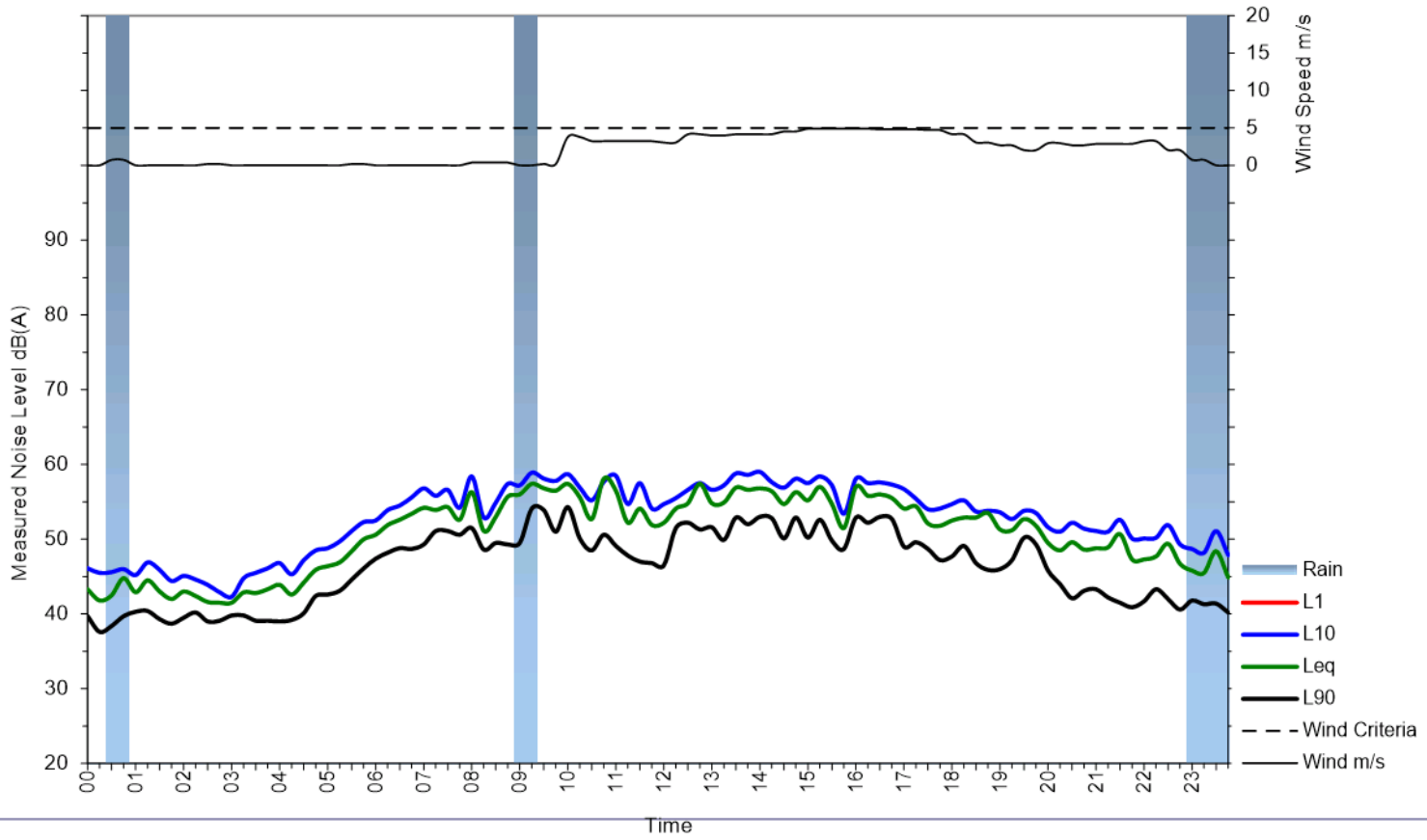


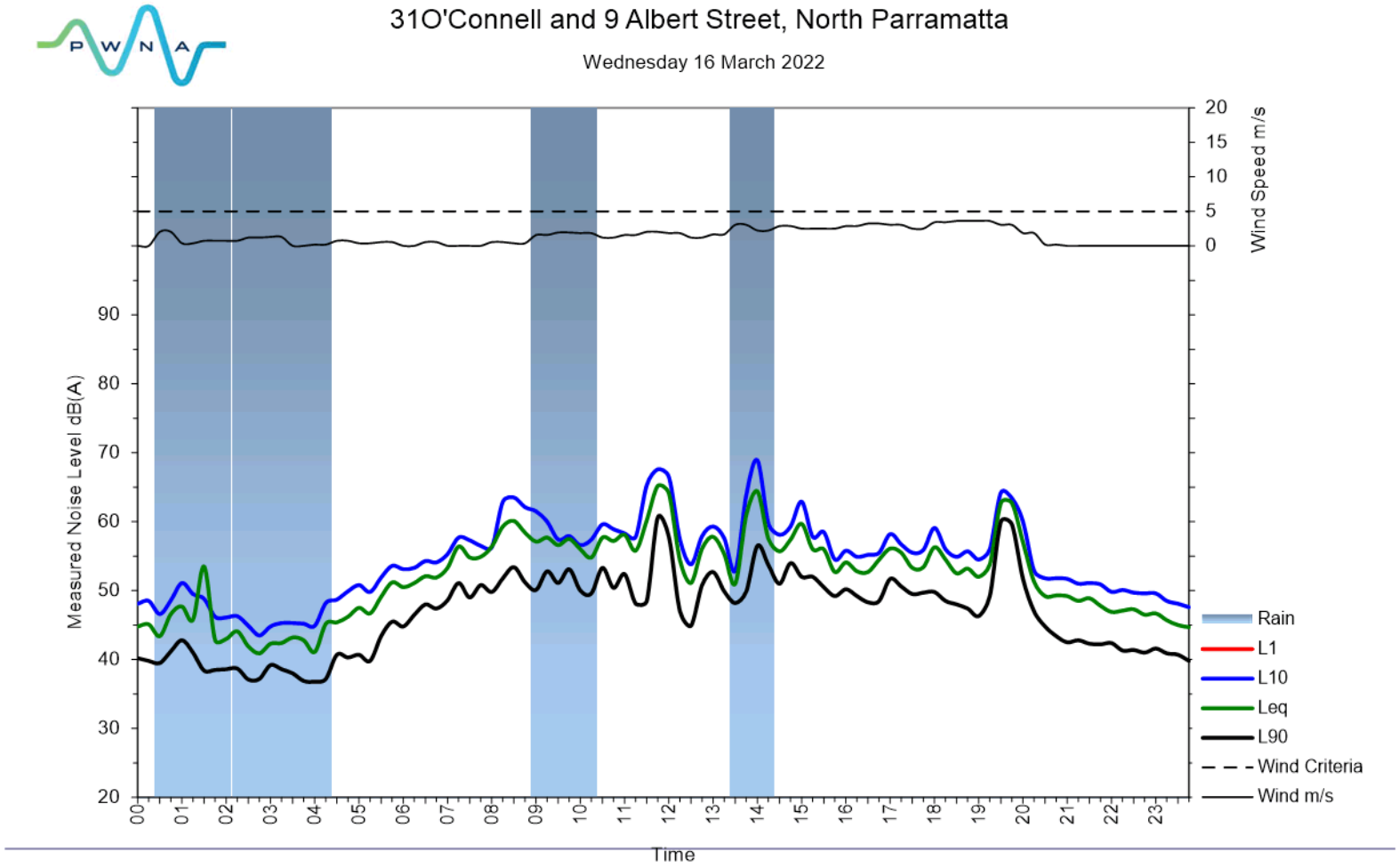

31O'Connell and 9 Albert Street, North Parramatta
Sunday 13 March 2022
Measured Noise Level dB(A)
Wind Speed m/s
Time
Rain
L1
L10
Leq
L90
Wind Criteria
Wind m/s

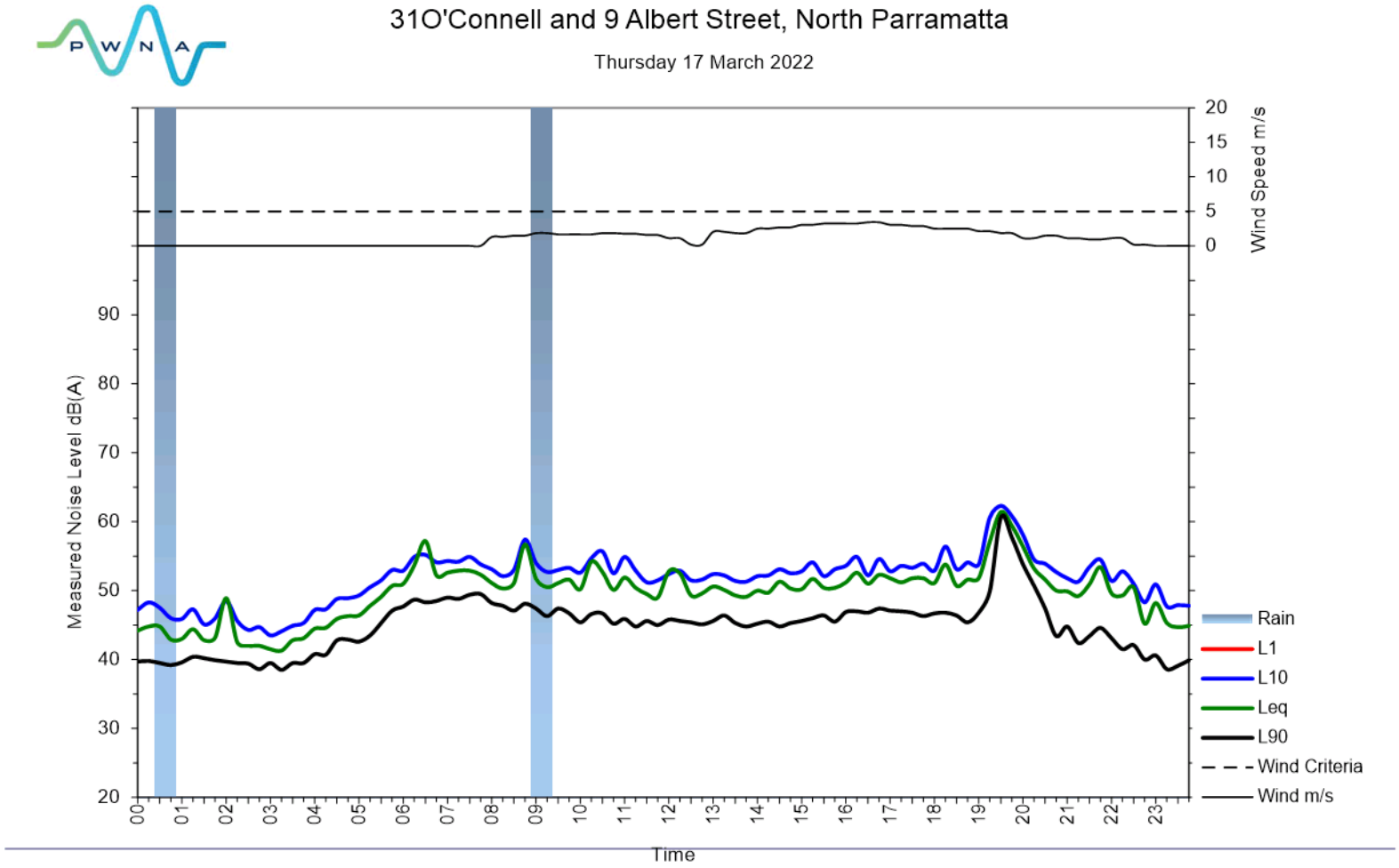

31O'Connell and 9 Albert Street, North Parramatta
Monday 14 March 2022
Measured Noise Level dB(A)
Wind Speed m/s
Time
Rain
L1
L10
Leq
L90
Wind Criteria
Wind m/s

31O'Connell and 9 Albert Street, North Parramatta

Tuesday 15 March 2022

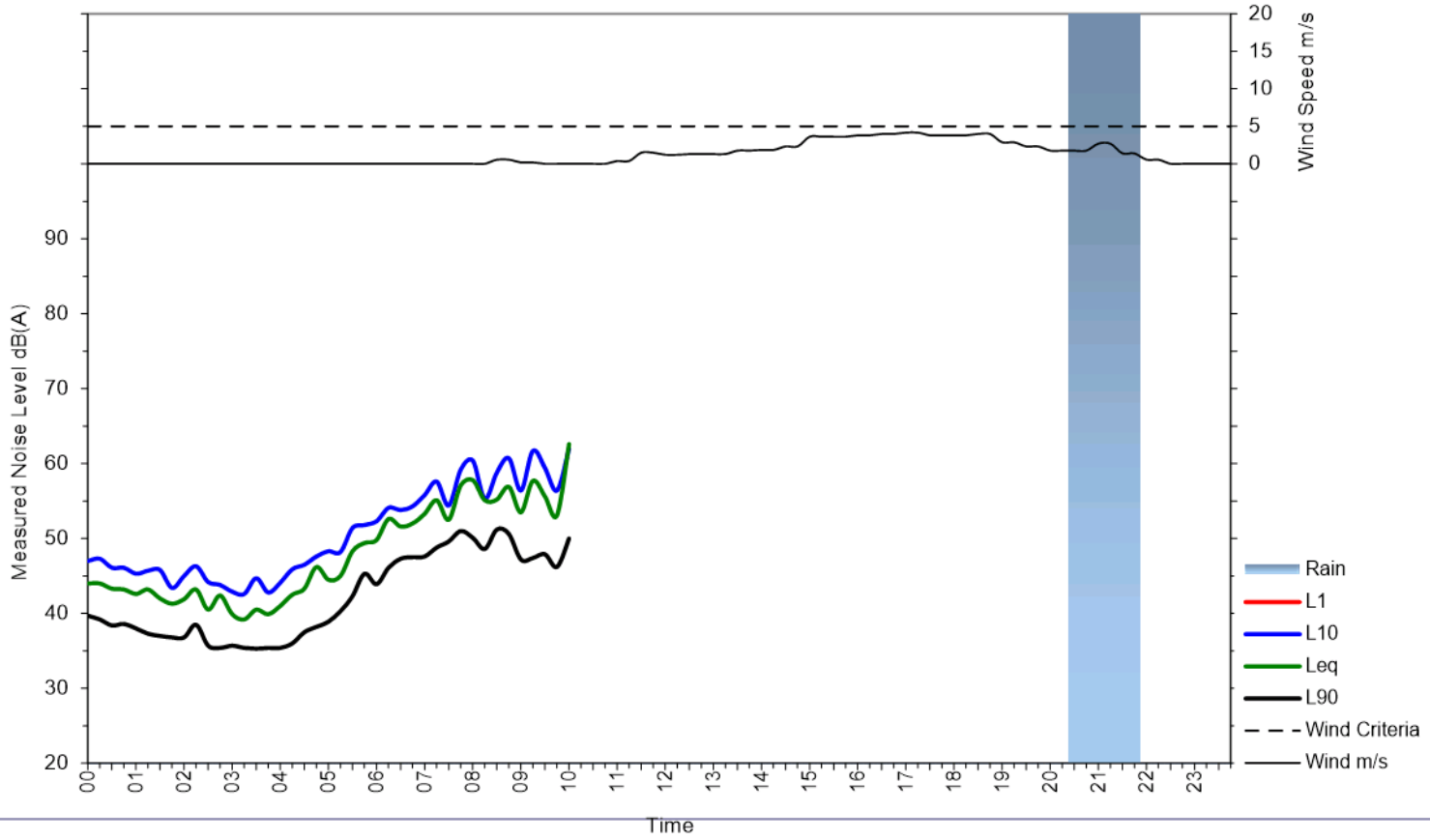



31O'Connell and 9 Albert Street, North Parramatta
Wednesday 16 March 2022
Measured Noise Level dB(A)
Wind Speed m/s
Time
Rain
L1
L10
Leq
L90
Wind Criteria
Wind m/s


31O'Connell and 9 Albert Street, North Parramatta
Thursday 17 March 2022
Measured Noise Level dB(A)
Wind Speed m/s
Time
Rain
L1
L10
Leq
L90
Wind Criteria
Wind m/s

31O'Connell and 9 Albert Street, North Parramatta

Friday 18 March 2022



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PETEROSE PTY LTD

Detailed Site Investigation

9 Albert Street and 31 O'Connell Street, North Parramatta NSW

E25473.02_Rev2
1 February 2024

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1	Updated based on client feedback and updated development plans	1 December 2022	NA/ES
2	Updated based on updated development plans	25 January 2024	LS/NK
2	Minor updates based on comments from client	1 February 2024	LS/NK

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EXECUTIVE SUMMARY

Peterose Pty Ltd (the client) engaged EI Australia Pty Ltd (EI) to conduct a Detailed Site Investigation (DSI) for the property located at 9 Albert Street and 31 O'Connell Street, North Parramatta NSW ('the site').

This site is located approximately 1.5km north of the Parramatta central business district, within the Local Government Area of the City of Parramatta Council (**Figure 1**, **Appendix A**). It is further identified as of Lot 1 in Deposited Plan (DP) 1143431 (9 Albert Street) and Lot 1 in DP998240 (31 O'Connell Street), comprising a total area of approximately 8,921m² (**Figure 2**). The site was bounded by two street frontages identified as Albert Street (north boundary) and O'Connell Street (east) and residential properties (west and south). At the time of this investigation, a one-level brick building and shed were present on site with a bitumen paved car park area. A child care facility is proposed to be constructed on the ground floor above the basement carpark. Soils located beneath the child care will be inaccessible, as the two and a half level basement is situated beneath the proposed child care and underlying soils, however soils in the outdoor play area will be accessible. The proposed development plans are attached in **Appendix C** (refer to DKO Architecture, dated 30 November 2023, and 14 November 2023).

The purpose of this environmental investigation was to characterise current soil and groundwater conditions across the site.

Objectives

The primary objectives of this investigation were:

- To evaluate the potential for site contamination on the basis of historical land uses, anecdotal and documentary evidence of possible pollutant sources;
- To investigate the degree of any potential contamination by means of soil and groundwater sampling and laboratory analysis, for relevant contaminants of concern;
- To provide a conclusion about suitability of the site for the proposed land use; and
- Make recommendations for the appropriate management of any contaminated soils or contaminated groundwater, if identified, for the site to be made suitable for proposed land use.

Findings

The key findings of this DSI were as follows:

- A review of site history indicated the site had been used for light commercial purposes as a medical facility (mental health hospital) from the 1950s. The site formerly contained commercial buildings in the northern portion from the 1950s onwards. Demolition and removal of structures occurred between 1986 and 2002.
- A search through the record of regulatory notices for contaminated land indicated that the site and neighbouring site were free of statutory notices issued by the NSW Environment Protection Authority (EPA). The site was not identified on the List of NSW contaminated sites notified to the EPA.
- Subsurface conditions were generalised as a pavement layer of asphalt (at some locations), followed by fill (to a maximum depth of 1.1m BGL), overlying natural, residual clays and bedrock at depth. Groundwater inflow was observed at depths between 6.5 m and 7.0 mBGL. Groundwater standing water level (SWL) was recorded at depths ranging from 0.92 m BGL to 3.21 m BGL.
- Contaminants of concern were reported in soil at concentrations below the most conservative human health-based investigation criteria (*HIL-A* and *HSL-A&B*) and

ecological criteria, with the exception of localised areas impacted with lead, Carcinogenic PAHs and TRH (F3).

- Concentrations of contaminants of concern were reported in groundwater below adopted fresh water criteria, with the exception zinc, which showed low level exceedances, but was reflective of background (regional) groundwater quality. The risk to human health and the environment from groundwater beneath the site is low.
- Review of the CSM indicated the model remains valid for the proposed development, with final remaining data gaps being the extent of localised areas impacted with lead, Carcinogenic PAHs and TRH (F3).

Conclusions and Recommendations

Based on the findings of this DSI and with consideration of the Statement of Limitations provided in **Section 11**, it was concluded that localised areas of soil impacted with lead, Carcinogenic PAHs and TRH (F3) were present; that is, significant (gross / widespread) contamination was not present on the site (**Figure 3**). The site can therefore be made suitable for the proposed mixed-use development, in accordance with *State Environment Protection Policy* (*Resilience and Hazards*) 2021 under the NSW *Environmental Planning and Assessment Act 1997*, subject to the following recommendations (outlined in **Section 10**) being implemented during development:

- Prior to site demolition, a suitably qualified and experienced consultant should be engaged to perform a Hazardous Materials Survey on existing site structures to identify potentially hazardous building products (such as asbestos and PCBs), that must be managed carefully to prevent potential release to the environment during demolition works.
- Preparation and implementation of a Remedial Action Plan (RAP) to comply with the NSW EPA 2020 guidelines for consultants reporting on contaminated land, including, but not limited to:
  - Procedures for remedial excavation of the localised areas impacted with lead, Carcinogenic PAHs and TRH (F3);
  - Procedures for the characterisation and validation of the deep soil areas outside the basement footprint;
  - A sampling and analysis quality plan (SAQP) for the validation of remediation activities performed on-site; and
  - An unexpected finds protocol for implementation during site excavation to ensure any unforeseen contamination is managed in accordance with the NSW legislation and relevant EPA guidelines.
- Any material being disposed from site, such as surplus soil removed from excavation and foundation works, including potential virgin excavated natural materials (VENM), to be properly assessed and classified for off-site disposal in accordance the NSW EPA (2014) *Waste Classification Guidelines*, followed by disposal to a waste facility that is appropriately licensed for the determined waste classification of the surplus material.
- Any material being imported to the site (i.e. for landscaping purposes) should be assessed for potential contamination in accordance with the EPA guidelines as being suitable for the intended land use, or be classified as VENM.
- Preparation of a final site validation report by a suitably qualified environmental consultant, certifying the site suitability of soils for the proposed land uses.
- Any soils to be retained on the site should be validated to meet the relevant ecological criteria, if they are to be located in proposed planting/landscaping areas.

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1. INTRODUCTION

1.1 Background and Purpose

EI Australia Pty Ltd (EI) was engaged by Peterose Pty Ltd ('the client') to conduct a Detailed Site Investigation (DSI) of 9 Albert Street and 31 O'Connell Street, North Parramatta NSW ('the site').

This site is located approximately 1.5km north of the Parramatta central business district, within the Local Government Area of the City of Parramatta Council (**Figure 1**, **Appendix A**). It is further identified as of Lot 1 in DP 1143431 (9 Albert Street) and Lot 1 in DP998240 (31 O'Connell Street), comprising a total area of approximately 8,950m² (**Figure 2**). The site was bounded by two street frontages identified as Albert Street (north boundary) and O'Connell Street (east) and residential properties (west and south). At the time of this investigation, a one-level brick building and shed were present on site with a bitumen paved car park area.

This DSI was conducted to inform a future application for redevelopment of the site. The purpose was to enable the developer to meet its obligations under the *Contaminated Land Management Act 1997*, in particular the requirements of *State Environmental Planning Policy (Resilience and Hazards) 2021* (SEPP 21), for the assessment and management of contaminated soil and/or groundwater. EI are not aware of any previous environmental investigations having been completed at the site.

The following document, supplied by the Client, was used to assist with the preparation of this report:

- STS (2010) *Geotechnical Investigation* (GI) *Report for No. 9 Albert Street, Parramatta*, prepared by SMEC Testing Services Pty Ltd, STS Report No. 10/2416, February 2010.

1.2 Proposed Development

The proposed development plans are attached in **Appendix C** (refer to DKO Architecture, dated 14th and 30th of November 2023).

Based on information provided by the Client, EI understands that the proposed development involves the demolition of existing site structures and the construction of three, multi-storey buildings (Buildings A-C) comprising apartments and retail tenancy (mixed-use) with gardens and communal areas. A two-and-a-half-level underground basement car park covering the majority of the site will be constructed with deep soil planting between the site boundaries and basement footprint, excluding the through-site link, as illustrated in **Figure 3 (Appendix A)**.

A lower ground level child care centre is proposed to be constructed on top of the basement carpark in the southern side of the site. The child care centre will extend beyond the southern edge of the underground basement, and will incorporate an outdoor play area over the deep soil zones, with existing trees to be retained.

The proposed development areas are highlighted on **Figure 3** (**Appendix A**), which also shows the relevant land use criteria applied to each area for environmental assessment purposes.

1.3 Regulatory Framework

The following regulatory framework and guidelines were considered during the completion of this DSI:

- *Contaminated Land Management Act 1997* (the CLM Act);
- *Parramatta Local Environmental Plan 2011* (LEP 2011);

- NSW EPA (2017) *Contaminated Land Management: Guidelines for the NSW Site Auditor Scheme (3rd Edition)*;
- NSW EPA (2020) *Guidelines for Consultants Reporting on Contaminated Land*;
- NSW EPA (2022) *Contaminated Land Guidelines: Sampling design part 1 - application*;
- NEPC (2013) *Schedule B(1) Guideline on Investigation Levels for Soil and Groundwater, Schedule B(2) Guideline on Site Characterisation* and Schedule B(4) *Guideline on Site Specific Health Risk Assessments,* in National Environmental Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013), National Environment Protection Council; and
- SEPP Resilience & Hazards (2021) *State Environment Protection Policy* (*Resilience and Hazards*) *2021*, under the NSW Environmental Planning and Assessment Act 1997.

1.4 Project Objectives

The primary objectives of this investigation were:

- To evaluate the potential for site contamination on the basis of historical land uses, anecdotal and documentary evidence of possible pollutant sources;
- To investigate the degree of any potential contamination by means of soil and groundwater sampling and laboratory analysis, for relevant contaminants of concern;
- To provide a conclusion about suitability of the site for the future land use; and
- Make recommendations for the appropriate management of any contaminated soils or contaminated groundwater, if identified, for the site to be made suitable for proposed land use.

1.5 Scope of Works

To achieve the above objectives, the following scope of works was adopted:

1.5.1 Desktop Study

- Preparation of a Work, Health, Safety and Environment Plan (WHSEP);
- A review of relevant hydrogeological and soil landscape maps for the project area;
- Review of previous environmental reports and provided documentation (where available);
- A detailed site walkover inspection;
- A detailed search of historical Council records for information relating to site development history and any records pertaining to environmental practices;
- A search of groundwater bore records within or in close proximity to the site;
- Search of historical aerial photographs archived at the NSW Land and Property Information in order to review previous site use and the historical sequence of land development in the neighbouring area;
- A land titles search, also conducted through NSW Land and Property Information for information relating to site ownership; and
- A search of the Lotsearch database for the site and surrounding properties;

- A search through the NSW EPA's contaminated land record of notices to determine if there are any current statutory notices on the site under Sections 58 and/or 60 of the *Contaminated Land Management Act 1997*; and
- A search of the Protection of the Environment Operations Act 1997 (POEO Act) public register for records related to environmental protection licences, applications, notices, audits, pollution studies, and reduction programmes.

1.5.2 Sampling and Laboratory Analysis

- Construction of test boreholes (BH1-BH20) at 20 locations distributed within accessible areas of the site;
- Construction of three groundwater monitoring bores (BH2M, BH18M and BH20M) to a proposed maximum drilling depth of 9m (or refusal to screen the sandstone layer) upgradient and downgradient of the proposed redevelopment area. Groundwater monitoring bores were constructed to standard environmental protocols to investigate the potential for groundwater contamination, and potential migration of dissolved phase contaminants across the site boundary;
- Multiple level soil sampling within fill and natural soils and one round of groundwater sampling from the three newly constructed groundwater monitoring bores;
- Laboratory analysis of selected soil samples and groundwater samples for relevant analytical parameters as determined from the site history survey and field observations during the investigation program; and
- Data interpretation and reporting.

1.6 Data Analysis and Reporting

This DSI report documents the desk study findings, an updated conceptual site model, data quality objectives, investigation methodologies and results. The report also provides the details of observations made during the site walkover inspection, borehole and monitoring well construction logs and a discussion of laboratory analytical results in regards to potential risks to human health, the environment and the aesthetic uses of the land.

2. SITE DESCRIPTION

2.1 Property Identification, Location and Physical Setting

The site identification details and associated information are presented in **Table 2-1**, and the site location is shown in **Figure 1**.

Table 2-1 Site Identification, Location and Zoning

Attribute	Description
Street Address	9 Albert Street and 31 O'Connell Street, North Parramatta NSW
Location and surrounding land use description	1.5km north of the Parramatta central business district and bounded by: ▪ North – Albert Street, followed by residential properties; ▪ South – Age care and residential properties, followed by Fennell Street; ▪ East – O'Connell Street, followed by residential properties; and ▪ West – Age care properties, followed by Fleet Street.
Site Coordinates	North-western corner of site (datum GDA2020-MGA56): ▪ Easting: 315141.103 ▪ Northing: 6257865.005 (Source: http://maps.six.nsw.gov.au)
Site Area	8910m^2 (Source: DKO Architecture, dated 14th and 30th of November 2023)
Lots and DP	▪ Lot 1 in DP1143431 (9 Albert Street); and ▪ Lot 1 in DP998240 (31 O'Connell Street).
State Survey (SS) Markers	Five site survey (SS) marks were in close proximity (<100 m) to the site. The SS mark closest to the site was: ▪ SS152469 located on the intersection of O'Connell Street and Albert Street (approximate 5m north). (Source: http://maps.six.nsw.gov.au)
Local Government Area	City of Parramatta Council
Parish	Field of Mars
County	Cumberland
Current Zoning	B4: Mixed Use (Parramatta Local Environmental Plan 2011)

2.2 Surrounding Land Use

The site is situated within an area of primarily commercial and residential use, as described in **Table 2-2**. The local sensitive receptors within close proximity to the site are also identified.

Table 2-2 Surrounding Land Uses

Direction	Land Use Description	Sensitive Receptors
North	Residential and commercial properties (including: restaurants, medical facilities etc.) and a cemetery	▪ Residents (approx. 10m north of the site) ▪ Medical facilities (approx. 20m north west of the site) ▪ St Patricks Cemetery (approx. 380m north east of the site)
South	Residential and commercial properties (including: community centres, restaurants/pubs, CommBank Stadium), a public park, schools and the Parramatta River	▪ Residents (approx. 50m south of the site) ▪ Parramatta Park (approx. 50m south of the site) ▪ Our Lady of Mercy College (approx. 250m south of the site) ▪ Saint Patricks Cathedral (approx. 300m south of the site) ▪ Bayanami Public School (approx. 350m south of the site) ▪ Prince Alfred Square (approx. 400m south of the site) ▪ Parramatta River (approx. 720m south of the site)
East	Residential and commercial properties (including: restaurants), a school	▪ Residents (approx. 50m east of the site) ▪ Parramatta North Public School (approx. 120m east of the site),
West	Commercial properties (including: Cumberland Hospital, shopping centres), nursing homes, residential properties, a hostel, park/gardens and the Parramatta River	▪ Hope Hostel (immediately west of the site) ▪ Southern Cross Care Marian Nursing Home (immediately west of the site) ▪ Lilian Wells Nursing Home (immediately west of the site) ▪ Residents (approx. 30m west of the site) ▪ Parramatta River (approx. 270m west of the site) ▪ Wistaria Gardens (approx. 290m west of the site)

2.3 Regional Setting

Local topography, (hydro)geology and soil landscape information is summarised in **Table 2-3**.

Table 2-3 Regional Setting Information

Attribute	Description
Topography	The site slopes from the north-east (approx. RL of 22m Australian Height Datum (AHD)) down towards the south-west (approx. RL of 18m AHD) of the site. (Source. https://www.mecone.com.au/mosaic/)
Site Drainage	Surface runoff is expected to flow to O'Connell Street and Albert Street), where it is collected via pit and pipe drainage of the local municipal stormwater system, which ultimately drains to Parramatta River (approx. 270m west of the site).
Regional Geology	Information on regional sub-surface conditions, referenced from the Department of Mineral Resources Geological Map Sydney 1:100,000 Geological Series Sheet 9130 (DMR 1983) indicates the site is located close to the boundary between Hawkesbury Sandstone (Rh) and Ashfield Shale (Rwa). Hawkesbury Sandstone typically comprises of medium to coarse-grained quartz sandstone, with very minor shale and laminite lenses, while Ashfield Shale typically comprises of dark-grey to black claystone-siltstone and fine sandstone-siltstone laminite.

Attribute	Description
Soil Landscape	The NSW Department of Planning, Industry and Environment (DPIE) eSPADE v2.0 website indicates that the site overlies the Lucas Heights (lh) residual landscape, which consists of gently undulating crests and ridges on plateau surfaces of the Mittagong formation (alternating bands of shale and fine-grained sandstones). Local relief to 30 m, slopes <10%. The Mittagong formation consists of interbedded shale, laminite and fine to medium grained quartz sandstone. Minor areas of Hawkesbury Sandstone and minor areas of Ashfield Shale may occur.
Acid Sulfate Soil (ASS) Risk	With reference to the Prospect/Parramatta River Soil Risk Map (1:25,000 scale; Murphy, 1997), the subject site lies within the land described as '*No Known Occurrence*' with regards to the Acid Sulfate Soil (ASS) risk. With reference to the Parramatta Local LEP (2011) Acid Sulfate Soils Map (Acid Sulfate Soils Map -Sheet ASS_009) the site lays in a Class 5 area. As such, the site is not expected to encounter acid sulfate soils during the proposed works.
Likelihood and Depth of Filling	Based on the test borehole logs generated under this DSI (**Appendix E**), the depth of fill ranged from the ground surface to 1.10 m BGL.
Typical Soil Profile	The site lithology encountered during the drilling was generalised as a layer of concrete/asphalt, followed by fill, overlying natural, residual clays and sandstone bedrock.
Depth to Groundwater	Groundwater standing water level (SWL) was recorded during this DSI investigation at depths ranging from 0.92 m BGL to 3.21 m BGL.
Nearest Surface Water Feature	Parramatta River (closest point located approx. 270m west of the site).
Groundwater Flow Direction	Groundwater was anticipated to flow in a westerly direction toward the Parramatta River, consistent with the local ground surface topography

2.4 Site Walkover

Observations were recorded during a walkover inspection of the site on 22 March 2022 (summarised below), performed with the assistance of a qualified services locator, to identify underground / buried services. Photographs taken during the inspection are presented in **Appendix D**. The location of the site features are illustrated on the site plan in **Figure 2** (**Appendix A**) and the proposed land use areas for the new development, are illustrated on **Figure 3**.

- The site comprised a one-storey brick building and a small shed/office. A portion of the site, between the two structures, was covered in asphalt for car parking, which appeared to be in fair to good condition with some deteriorated patches, cracks and minor staining observed. Some general debris was observed surrounding the shed/office area (**Photographs 1-4**);
- Vegetation (mature trees), present along the northern, western and southern boundaries, appeared to be in good condition (i.e. no visible evidence of stress), indicating that the local soils were unlikely to be phytotoxic (**Photographs 5-6**);
- The site was relatively flat and sloped gently towards the south-west;
- There was no evidence, by way of a fill / dip point or vent, that any active underground storage tank(s) (UST) was/were present on the site. No evidence of above-ground tank storage was identified either; and

- No evidence of potential asbestos-containing materials (ACM) was observed during the site walkover inspection. Due to the age and history of the site, however, it was considered possible that ACM may have been used in construction or modification of previous structures, and therefore may be present in underlying fill/soil.

3. SITE HISTORY AND SEARCHES

3.1 Historical Aerial Review

Information obtained from the available historical aerial photographs regarding site uses are presented in **Table 3-1**. The historical aerial photographs reviewed as part of this DSI included:

- **1943:** Six Maps;
- **1951:** NSW 9130 R9, 01-05-1951;
- **1961:** NSW 1051 R30, 27-06-1961;
- **1970:** NSW 1911 R14, 01-01-1970;
- **1986:** NSW 3528 R19, 03-08-1986;
- **1991:** NSW 9030 R8, 20-09-1991;
- **2002:** NSW 9130 R9, 16-03-2002;
- **2010 – 2022:** Google Map; and
- **2022: Nearmaps.**

Table 3-1 Summary of Aerial Photograph History

Aerial Photograph	Site description based on historical aerial photographs
9 Albert Street, North Parramatta (Lot 1 in DP1143431)	
1943	The site appeared to consist of vacant land with no visible structures present.
1951	The site appeared to consist of two buildings which are still present to date.
1961	The site appeared relatively unchanged with the exception of the addition of a small shed/structure within the north-western portion of the site.
1970	The site appeared unchanged from the previous aerial photograph.
1986	The site appeared relatively unchanged with the exception of the demolition of the previously noted shed/structure and the addition of two structures within the north-western portion of the site and a paved car-parking area surrounding the main structure.
1991	The site appeared unchanged from the previous aerial photograph.
2002	The site appeared relatively unchanged with the exception of the removal of one of the structures within the north-western portion of the site.
2010, 2020	The site appeared unchanged from the previous aerial photograph.
2022	Site structures were recently demolished, in preparation for construction works.
31 O'Connell Street, North Parramatta (Lot 1 in DP998240)	
1943	The site appeared to consist of vacant land with no visible structures present.
1951, 1961, 1970, 1986, 1991, 2002, 2010, 2020	The site appeared unchanged from the previous aerial photograph.
2022	Site structures were recently demolished, in preparation for construction works.

In summary, review of historic aerial photography indicated that the site formerly contained light commercial buildings in the northern portion of the site, from the 1950s onwards and that demolition and removal of structures occurred between 1986 and 2002. This indicated the potential for ACM fragments to be present in site soils, as asbestos materials were historically used for cladding in older parts of Sydney.

3.2 Groundwater Bore Records and Local Groundwater Use

An online search of registered groundwater bores was conducted on 26 May 2022 via the WaterNSW website database (Ref. https://realtimedata.waternsw.com.au/water.stm). There were no registered bores identified within a 500 m radius of the site. A groundwater bore location map is attached in **Appendix F**.

3.3 Site Land Titles Information

A historical land titles search was conducted through InfoTrack Pty Ltd. Copies of relevant documents resulting from this search are presented in **Appendix G**. A summary of all the previous and current registered proprietors is provided in **Table 3-3**.

Table 3-2 Summary of Owner History

Date of Acquisition and term held	Registered Proprietor(s) & Occupations (where documented)
9 Albert Street (Lot 1 in D.P. 1143431)	
23.10.1907 (1907 to 1933)	Crown Reserve 42120 Extension for Site of Hospital for Insane
17.02.1933 (1933 to 2008)	Minister for Public Instruction (Then) Minister for Education (Now) Minister for Education and Training (For the Purposes of the Public Instruction Act of 1880)
04.12.2008 (2008 to Date)	# New South Wales Land and Housing Corporation
23.10.1907 (1907 to 1933)	Crown Reserve 42120 Extension for Site of Hospital for Insane

Note 1 Leases: NIL
Note 2 # Denotes current registered proprietor.

3.4 Site Usage

The Council Assessment Report (DA/1047/2017, dated 21 December 2017) indicates the site was approved to become a temporary group home in 2009, and the Historical Archaeological Assessment prepared for NSW Land and Housing Corporation (dated 27 June 2018) found it to be used for art studios and as an art school until early 2018.

Information provided anecdotally by the Client in regards to the condition of the site at the time of demolition was that the site was being used as a preschool (Personal conversation with Mr Mitchell Favaloro on the 1/02/24).

Based on the ownership history of the site, it is inferred that the site has been predominantly used for commercial purposes, with commercial use including medical and social purposes, most recently being childcare.

3.5 Lotsearch Information

EI engaged Lotsearch Pty Ltd to undertake (obtain and compile) a search of historical records for the site and surrounding area. Copies of relevant documents resulting from the Lotsearch report (Lotsearch Enviro Lite, Ref. LS027909 EL, dated 4 January 2022) are presented in **Appendix H**. A review of relevant historical information is summarised below:

3.5.1 Contaminated Land Record of Notices

An online search of the contaminated land public record of NSW EPA Notices was conducted on 26 May 2022. The contaminated land public record is a searchable database of:

- Orders made under Part 3 of the *Contaminated Land Management Act 1997* (CLM Act);
- Notices available to the public under Section 58 of the CLM Act;
- Approved voluntary management proposals under the CLM Act that have not been fully carried out and where the approval of the EPA has not been revoked;
- Site audit statements provided to the EPA under Section 53B of the CLM Act that relate to significantly contaminated land;
- Where practicable, copies of anything formerly required to be part of the public record; and
- Actions taken by EPA under Section 35 or 36 of the *Environmentally Hazardous Chemicals Act 1985* (EHC Act).

The search confirmed that the site known as 9 Albert Street and 31 O'Connell Street, North Parramatta NSW and surrounding lands within close proximity (within 250 m) were not subject to any regulatory notices relevant to the above legislation.

3.5.2 List of NSW Contaminated Sites Notified to EPA

A search through the List of NSW Contaminated Sites notified to the EPA under Section 60 of the CLM Act 1997 was conducted on 26 May 2022. This list is maintained by EPA and includes properties on which contamination has been identified. Not all notified land is deemed to be impacted significantly enough to warrant regulation by the EPA. The site or localities in proximity (within 250 m) to the site have not been notified as contaminated to the EPA with the exception of one site:

Records indicated one notified site present within a 1km radius of the investigation site:

- Name: BP Connect Parramatta, Address: 433-437 Church Street Parramatta, Management Class: Regulation under CLM Act not required, Distance: 258m south-east of the site.

3.5.3 POEO Public Register

A search of the *Protection of the Environment Operations Act* (POEO Act) public register was conducted on 26 May 2022. The public register contains records related to environmental protection licences, applications, notices, audits, pollution studies, and reduction programmes. The search for the North Parramatta region did not identify any locations within close proximity (within 250 m) to the site on the POEO Public register. The following information was identified in this register:

Former Gasworks

No record of former gasworks was present within a 1km radius of the site.

Waste Management

No records from the National Waste Management Site Database were present within a 1km radius of the site.

Liquid fuel facilities

Records from the National Liquid Fuel Facilities indicated one site was present cross-gradient and within a 1km radius of the site:

- Name: BP Connect Parramatta, Address: 433-437 Church Street Parramatta, Class: Petrol Station, Distance: 258m south-east of the site.

PFAS Investigation & Management Programs

No properties that were part of the NSW EPA's Per and Poly-Fluroalkyl Substances (PFAS) Investigation Program or the Defence or Airservices Australia PFAS programs were present within a 1 km radius of the site.

Defence Sites

No Department of Defence sites were present within a 1km radius of the site.

EPA other sites with contamination issues

There were no properties listed on the EPA website as having contamination issues from James Hardie asbestos manufacturing and waste disposal sites, Radiological investigation sites in Hunter's Hill or Pasminco Lead Abatement Strategy Area within 1km of the site with the exception of the following:

- Name: Cumberland Oval, Address: O'Connell Street Parramatta, Dataset: James Hardie Asbestos Waste Sites, Distance: 292m south-west of the site; and
- Name: Catt and Goldsmith Pty Ltd, Address: Victoria Road Parramatta, Dataset: James Hardie Asbestos Waste Sites, Distance: 371m south-east of the site.

EPA Activities

There were two sites identified in the Licensed Activities under the Protection of Environment Operations (POEO) Act 1997 within a 1 km radius of the site which involved the following activities:

- Railway infrastructure systems, located approx. 200m north-west and cross-gradient to the site; and
- Railway infrastructure systems, located approx. 200m north-west and up and cross-gradient to the site.

There were no delicensed activities regulated by the EPA were identified within 1 km radius which involved the following activities.

Four former Licensed Activities under the POEO Act 1997 that are now revoked or surrendered were identified, which involved the following activities:

- Surrendered: Other Activities / Non Scheduled Activity - Application of Herbicides, located approx. 254m south-west and cross-gradient to the site (License Numbers 4653, 4838 and 6630); and
- Surrendered: Miscellaneous licensed discharge to waters (wet weather only), located approx. 273m south-west and cross-gradient to the site.

3.5.4 Historical Business Directory

No business activities were listed to have operated on the site from 1950 to 1991. Business activities within close proximity of the site (100m) include, but not limited to:

- Mixed businesses, publishers, grocers, take-away foods, hospitals, architects, earth moving machine hires, retails, air conditioning sales, tilers and printers.

Business activities (including motor garages, service stations and drycleaners) that operated within close proximity of the site (approx. 250 m) are outlined below in **Table 3-4**:

Table 3-3 Summary of Surrounding Business Activities

Period	Business Activity	Direction & Distance in relation to the site
1962 – 1979	Motor Garages &/or Engineer &/or Service Stations	213m east (up-gradient)
1950 – 1965	Motor Garages &/or Service Stations	240m south-east (cross-gradient)
1961 – 1969	Motor Garages &/or Service Stations	240m south-east (cross-gradient)

Based on review of the information provided above, it is concluded that historically there was a low to moderate potential for contamination from the businesses operating in close proximity to the site (<250 m), including motor garages and service stations.

3.5.5 Heritage

No Commonwealth, State or National heritage sites were within close proximity (approx. 50m) to the site.

Ten sites were listed as Environmental Planning Instrument (EPI) Heritage Items (listed under the *Parramatta Local Environmental Plan 2013* were within close proximity (approx. 50m) to the site:

- Stone Fence, located on the site;
- North Parramatta Conservation Area, located approx. 11m south east of the site;
- Stone kerb and gutter, located approx. 15m north of the site;
- Single storey residence, located approx. 22m east of the site;
- Hollywood, located approx. 22m south east of the site;
- Dorislea, located approx. 22m north east of the site;
- Residence, located approx. 22m east of the site;
- Single storey residence, located approx. 41m south of the site;
- Single storey residence, located approx. 48m east of the site; and
- Single storey residence, located approx. 50m south of the site.

3.5.6 Other datasets

- The site and its surroundings were not recorded as having a "naturally occurring asbestos potential";
- Dryland salinity assessment data were recorded as hazard low to moderate risk for the site and its surroundings;
- No mining subsidence district was present within the surveyed area; however, historical mining and exploration titles were present (petroleum and geothermal holders) across the surveyed area;
- No SEPP State Significant Precincts were recorded in the vicinity of the site (<1 km);
- No natural hazard (bushfire prone land) constraint applied to the site; and

- Ecological constraints such as low potential groundwater dependent ecosystems and inflow dependent ecosystems were not identified within the vicinity of the site. However, native and exotic vegetation was identified to be present on-site.

3.6 Council Information

An application to access property files held by City of Parramatta Council was requested on 20 December 2021 by EI. The files pertaining to 9 Albert Street and 31 O'Connell Street, North Parramatta NSW included Valuation Lists. The files did not contain any records pertaining to contamination, storage of dangerous goods or complaints. A copy of the provided records is attached in **Appendix I**.

3.7 Overall Search Finding

Search findings indicated one offsite, mobile contamination source being the BP Connect service station at 433-437 Church Street, located 258m south-east of the site; however, as that property is located cross hydraulic gradient in relation to the site, it was not deemed to be posing any potential risks of adversely impacting the subject site.

4. CONCEPTUAL SITE MODEL

In accordance with NEPM (2013) *Schedule B2 – Guideline on Site Characterisation* and to aid in the assessment of data collection for the site, EI developed a conceptual site model (CSM) assessing plausible pollutant linkages between potential contamination sources, migration pathways and receptors. The CSM provides a framework for the review of the reliability and useability of the data collected and to identify data gaps in the existing site characterisation.

4.1 Potential Contamination Sources

On the basis of site history and search findings (summarised in **Section 3**) EI consider potential chemical hazards and onsite contamination sources to be:

- Importation of fill of unknown origin and quality placed at the site;
- Historical land uses including use of the site as a hospital;
- Low-level leakage of petroleum hydrocarbons from vehicles parking and driving across the site;
- Weathering of exposed building fabrics, painted surfaces and metallic objects from site structures;
- Previous demolition of former site structures potentially resulting in contamination of surface soils and/or burial of hazardous building materials;
- Potential impacts from the historic use of pesticides for termite control beneath site structures and sealed surfaces and general pest control; and
- Potential unknown off-site sources (including the surrounding commercial properties).

4.2 PFAS Assessment

NSW EPA (2017) requires that PFAS is considered in assessing contamination. EI use the following decision tree (**Table 4-1**) based on EnRisk (2016) for prioritising the potential for PFAS to be present on site and whether PFAS sampling of soil and groundwater is required.

Table 4-1 PFAS Decision Tree

Preliminary Screening	Probability[1]	Justification
Is the past or present site activity listed in the NEMP (2018)[2] as being an activity with risk of fire. If so list activity:	L	Site history does not indicate related activities occurred on-site.
Is the past or present off-site activity up-gradient or adjacent to the site listed in the NEMP (2018)[2] as being an activity with risk of fire. If so list activity:	L	Off-site (up-gradient or adjacent to the site) history does not indicate related activities occurred on-site.
Did fire training involving the use of suppressants occur on-site between 1970 and 2010?	L	Site history does not indicate fire-training activities occurred on-site.
Did fire training occur up-gradient of or adjacent to the site between 1970 and 2010?	L	Off-site (up-gradient or adjacent to the site) history does not indicate related activities occurred on-site.

Preliminary Screening	Probability[1]	Justification
Is an airport or fire station up gradient of or adjacent to the site? [1]	L	Fire and Rescue NSW Parramatta Fire Station is approximately 5km south-east from the site, and cross gradient.
Have "fuel" fires ever occurred on-site? e.g. ignition of fuel (solvent, petrol, diesel, kerosene) tanks?	L	Site history does not indicate storage of petroleum products.
Have PFAS been used in manufacturing or stored on-site? [2]	L	Site history does not indicate storage or manufacturing of PFAS
Could PFAS have been imported to the site in fill materials from a site with activity listed in NEMP (2018)? Importation of fill materials of unknown chemical quality within the site.	L	NA
Could PFAS-contaminated groundwater or run-off have migrated on to the site?	L	Site history indicates nearby surrounding land consisted primarily of residential uses. Therefore, the potential for the migration of contaminated groundwater on-site is low
Is the site or adjacent sites listed in the NSW EPA PFAS Investigation Program? [5]	L	No
If the probability is medium or high in any of the rows, does the site analytical suite need to be optimised to include preliminary sampling and testing for PFAS in soil (incl. ASLP testing) and waters? See explanation below.	-	No

Note 1 Runoff from fire training areas may impact surface water, sediment and groundwater.
Note 2 PFAS is used wide range of industrial processes and consumer products, including in the manufacture of non-stick cookware, specialised garments and textiles, Scotchguard™ and similar products (used to protect fabric, furniture, leather and carpets from oils and stains), metal plating and in some types of fire-fighting foam (https://www.nicnas.gov.au/chemical-information/factsheets/chemical-name/perfluorinated-chemicals-pfas)
Note 3 If medium or high probability is applicable to any of the preliminary screening questions, the site analytical suite will be optimised to include preliminary sampling and testing for PFAS in soil (ASLP Testing) and water.
Note 4 [1] L = Low, M = Medium, H = High

4.3 Emerging chemicals

The NSW EPA uses Chemical Control Orders (CCOs) as a primary legislative tool under the EHC Act (1985) to selectively and specifically control particular chemicals of concern, and limit their potential impact on the environment. CCOs provide the EPA a rapid and flexible mechanism for responding to emerging chemical issues. As with PFAS compounds, EI has considered chemicals controlled by CCOs and other potential emerging chemicals in this assessment as outlined in **Table 4-2.**

Table 4-2 Emerging or Controlled Chemicals

Chemicals of Concern (CCO or emerging)	Decision
Were aluminium smelter wastes used or stored on Site (CCO, 1986)?	No
Do dioxin contaminated wastes (CCO, 1986) have the potential to impact the Site? [1]	No
Were organotin products (CCO, 1989) used or stored on Site? [2]	No

Chemicals of Concern (CCO or emerging)	Decision
Were polychlorinated biphenyls (PCBs) used or PCB wastes (CCO, 1997) stored on-Site? [3]	No
Were scheduled chemical or wastes (CCO, 2004) used or stored 4	Potentially *Possible pesticides used onsite (sub-slab) for termite control and general pest control.*
Are other emerging chemicals suspected? [5]	No
If Yes to any questions, has Site sampling suite been optimised to include specific sampling for other chemicals of concern in soil, air, and water	*Identified in* ***Section 5.4***

Note 1 From burning of certain chemicals, smelting or chemical manufacturing or fire on or near the Site.
Note 2 From anti-fouling paints used or removed at boat & ship yards and marinas.
Note 3 From older transformer oils & electrical capacitors
Note 4 Twenty-four priority organochlorine pesticides and industrial by-products
Note 5 Other chemicals considered as emerging e.g. 1,4 dioxane (associated with some VOCs).

4.4 Likelihood for Contamination on the Site

An assessment of the potential contamination risks for the site is outlined in **Table 4-3**.

Table 4-3 Assessment of Potential Contamination Risks

Potential Source	Impacted Medium	Potential contaminants	Likelihood (Risk) of Contamination
Former on-site commercial activities	Soil and groundwater	HM, TRH, VOC (incl. BTEX), PAH and phenols	**Moderate** Historical land use from 1950s to date, the site appeared to consist of commercial land use related to medical use.
Importation of fill of unknown origin and quality	Shallow soil	HM, TRH, BTEX, PAH, OCP, OPP, PCB and asbestos	**Moderate** Filling was observed in all locations sampled (see borehole logs, **Appendix E**).
Weathering of exposed building fabrics with hazardous materials / uncontrolled demolition of former structures	Surface soil	HM (lead in particular), PCB and asbestos	**Moderate** Historical information indicated that from 1950s to date, the site appeared to have several phases of construction of site structures followed by demolition.
Leakage from vehicles in parking areas	Surface soil	HM, TRH, VOC (including BTEX)	**Low** Site walkover inspection and historical aerial photographs indicated a portion of the site currently being used as a car park. The majority of the car-park area is sealed with asphalt and concrete pavement.
Application of pesticides	Surface soils (building footings)	HM (arsenic and copper in particular), OCP, OPP	**Low to Moderate** If present, expected to be limited to shallow, building footprint soils, due to the nature of their application. Metals and OCP may persist in soils.
Migration from off-site sources	Soil and groundwater	HM, TRH, VOC (including BTEX) and PAH,	**Low** Surrounding properties were occupied by a variety of residential and commercial businesses. A low probability of potential contaminant migration from adjoining

Potential Source	Impacted Medium	Potential contaminants	Likelihood (Risk) of Contamination
			properties is considered.

4.5 Potential Contaminants

Based on previous findings and the site history review, the potential contaminants at the site are considered to be:

- In soil – heavy metals (HMs), total recoverable hydrocarbons (TRH), polycyclic aromatic hydrocarbons (PAH), the monocyclic aromatic hydrocarbon (MAH) compounds benzene, toluene, ethylbenzene and xylenes (BTEX), organochlorine and organophosphate pesticides (OCP/ OPP), polychlorinated biphenyls (PCB), total phenols and asbestos.
- In groundwater – heavy metals (HMs), total recoverable hydrocarbons (TRH), polycyclic aromatic hydrocarbons (PAH), the monocyclic aromatic hydrocarbon (MAH) compounds benzene, toluene, ethylbenzene and xylenes (BTEX) and total phenols.

4.6 Potential Sources, Exposure Pathways and Receptors

Potential contamination sources, exposure pathways and human and environmental receptors that were considered relevant for this DSI are summarised in **Table 4-4**. This table includes a qualitative assessment of the potential risks posed by complete exposure pathways.

4.7 Data Gaps

EI considered a program of intrusive investigation was warranted for this site, to include targeted and grid-based sampling across the site to assess for potential contamination, as indicated by the listed potential sources in **Section 4.1**.

Table 4-4 Conceptual Site Model

Potential Sources	Impacted Media	Potential contaminants	Transport mechanism	Exposure pathway	Potential receptor
▪ Fill soils of unknown origin; ▪ Historic use of the site (medical use); ▪ Possible impacts from historic use of pesticides beneath site structures; ▪ Impacts from uncontrolled demolition of historic site structures; ▪ Spills and leaks from parked vehicles; and ▪ Migration of contamination onto site from adjoining properties and unknown offsite contamination sources.	Soil	HM, Petroleum Hydrocarbons (as TRH), PAHs, OCP/OPP, PCB, BTEX, VOCs, phenols and asbestos	Disturbance of surface and subsurface soils during site redevelopment, future site maintenance and future use of the site post redevelopment	Ingestion Dermal contact Inhalation of dust particulates Biota uptake	Construction and maintenance workers End users of the site post redevelopment (residential and commercial tenants)
			Atmospheric dispersion from soil to outdoor and indoor air spaces	Inhalation of particulates	
		Petroleum Hydrocarbons (TRH-F1,TRH-F2), BTEXN and VOCs	Volatilisation of contamination from soil and diffusion to indoor air spaces	Inhalation of vapours from impacted soil	
	Groundwater	HMs, TRH, BTEXN, phenols and VOCs	Migration of dissolved phase impacts in groundwater	Biota uptake Ingestion Dermal contact	Aquatic ecosystems Domestic groundwater users
			Potential (offsite) basement seepage intercepting water table.	Dermal contact Ingestion	Construction and maintenance workers
Building fabrics (former site structures) containing hazardous materials.	-	Lead, PCB and asbestos	Release of hazardous materials during uncontrolled demolition of buildings	Ingestion Dermal contact Inhalation of airborne contaminants	Users of the site Construction and maintenance workers

5. METHODOLOGY

5.1 Sampling, Analytical and Quality Plan (SAQP)

The SAQP ensures that the data collected during environmental works at a site are representative and provide a robust basis for assessment decisions. The SAQP for this DSI included the following:

- Data quality objectives, including a summary of the objectives of the DSI;
- Investigation methodology, including the media to be sampled, details of analytes and parameters to be monitored and a description of intended sampling points;
- Sampling procedures;
- Field screening methods;
- Sample handling, preservation and storage;
- Laboratory analysis methods; and
- Analytical quality assurance / quality control (QA/QC).

5.2 Data Quality Objectives (DQO)

In accordance with the USEPA (2006) *Data Quality Assessment* and NSW EPA (2017) *Guidelines for the NSW Site Auditor Scheme*, Data Quality Objectives (DQO) were developed and used by the EI assessment team to determine the appropriate level of data quality needed for the specific data requirements of the project. The DQO process that was applied for this DSI is documented in **Table 5-1**.

Table 5-1 Summary of Project Data Quality Objectives

DQO Step	Details	Comments (changes during investigation)
1. State the Problem Summarise the contamination problem that will require new environmental data and identify the resources available to resolve the problem; develop a conceptual site model.	The site located at 9 Albert Street and 31 O'Connell Street, North Parramatta NSW required detailed investigation to quantify any potential contamination and inform a future application for site redevelopment to be assessed by Council. Review of the site history (summarised in **Section 3**) established that contamination may be present in the site soil, contributed by various potential sources listed in **Section 4.1**. The proposed redevelopment (**Section 1.2**) involves the construction of residential/commercial development with two and a half basement levels. A child care facility is proposed to be situated on the ground floor above the two and a half-level basement. This investigation was required to characterise the condition of site soils and groundwater, thereby enabling the developer to meet its obligations under SEPP (Resilience and Hazards) 2021.	-
2. Identify the Goal of the Study (Identify the decisions) Identify the decisions that need to be made on the contamination problem and the new environmental data required to make them.	Based on the objectives outlined in **Section 1.4**, the decisions that needed to be made were: ▪ Have the nature, extent and source of any soil and/or groundwater impacts on-site been defined? ▪ What impact do the site specific, geologic and hydrogeological conditions have on the fate and transport of any contaminants that may be present? ▪ Does the level of impact, coupled with the fate and transport of identified contaminants, represent an unacceptable risk to identified human and/or environmental receptors on- or off- site? ▪ Does the collected data provide sufficient information to allow the suitability of the site to be determined, or selection and design of an appropriate remedial strategy, if necessary? ▪ If the data does not provide sufficient information, what data gaps require closure to enable the suitability of the site to be determined, or selection and design of an appropriate remedial strategy?	-

DQO Step	Details	Comments (changes during investigation)
3. Identify Information Inputs (Identify inputs to decision) Identify the information needed to support any decision and specify which inputs require new environmental measurements.	Inputs to the decision making process included: ▪ Proposed development plans and land use; ▪ Review of previous investigations at the site; ▪ National and EPA guidelines endorsed under the *NSW Contaminated Land Management Act 1997*; ▪ Soil and groundwater observations obtained from an intrusive investigation in locations and to depths deemed appropriate for assessment purposes (or prior auger refusal); ▪ Sampling and testing to assess for the presence of on-site contamination and to evaluate the potential risks to sensitive receptors; and ▪ Laboratory analysis of selected soil and groundwater samples for the identified potential contaminants (**Section 4.4**). At the end of the assessment, a decision had to be made regarding whether the environmental conditions were suitable for the proposed redevelopment, or if additional investigations / remedial works were required to make the site suitable.	-
4. Define the Boundaries of the Study Specify the spatial and temporal aspects of the environmental media that the data must represent to support decision.	*Lateral* – The cadastral boundaries of the site. *Vertical* – From the existing ground surface and underlying fill to the natural soil horizons and bedrock. *Temporal* – Results are valid on the day of data / sample collection and remain valid as long as no changes occur on site or contamination (if present) does not migrate on site or on to the site from off-site sources.	-
5. Develop the Analytic Approach (Develop a decision rule) To define the parameter of interest, specify the action level, and integrate previous DQO outputs into a single statement that describes a logical basis for choosing from alternative actions.	Laboratory test results were accepted where: ▪ All contracted laboratories were accredited by NATA for the analyses undertaken; ▪ All laboratory analytical data were within pre-determined assessment criteria, in accordance with laboratory QA/QC policies and DQOs; ▪ QA/QC results demonstrated acceptable reliability and representativeness of the data set; and ▪ Laboratory practical quantitation limits (PQL) were below the adopted assessment criteria for the tested COPC. The principal decision rule for the investigation was: ▪ If the concentrations of contaminants in the soil exceeded the adopted assessment criteria, then determine the need to further investigate the extent of impact(s) on-site. Decision criteria for QA/QC measures are defined by the Data Quality Indicators (DQI) in **Table 5-2**, in **Section 5.3**.	-

DQO Step	Details	Comments (changes during investigation)
6. Specify Performance or Acceptance Criteria (Specify limits on decision errors) Specify the decision-maker's acceptable limits on decision errors, which are used to establish performance goals for limiting uncertainties in the data.	Specific limits for this project were in accordance with National and EPA guidance, appropriate indicators of data quality and standard procedures for field sampling and handling. This included the following points to quantify tolerable limits: ▪ The null hypothesis for the investigation was that the mean / maximum concentrations for the tested contaminants exceeded relevant land use criteria across the site. The acceptance of the site was based on: ▪ The mean of the data satisfied the given site criterion (for a given potential contaminant); ▪ The standard deviation of the results was less than 50% of the relevant criterion; ▪ No single results exceeded the assessment criteria by 250% or more; and ▪ Soil contaminant concentrations that were below assessment criteria made or approved by the EPA were treated as acceptable and indicative of suitability for the proposed land use(s). Hence, if contaminant concentrations in soil exceeded the adopted criteria, further investigation was considered prudent. If no contamination was detected in soil, no further action was required.	-
7. Develop the Detailed Plan for Obtaining Data (Optimise the design for obtaining data) Identify the most resource-effective sampling and analysis design for general data that are expected to satisfy the DQOs.	The sampling and analysis design for this DSI is outlined below. ▪ Written instructions were issued to guide personnel in the required fieldwork activities; ▪ Construction of test boreholes at 20 locations (BH1-BH20) reached a maximum depth of 9.0m BGL. The area of the site was approximately 8,921m², and the sampling density met minimum requirements of NSW EPA (2022) Contaminated Land Guidelines on *Sampling design,* which recommended 20 sample points for an area of 9,000 m² based on detection of a circular hot spot using a systematic sampling pattern; ▪ Construction of three groundwater monitoring bores drilled to a maximum depth of 9m (or refusal) upgradient and downgradient of the proposed redevelopment area. Groundwater monitoring bores will be constructed to standard environmental protocols to investigate the potential for groundwater contamination and offsite migration; ▪ Multiple level soil sampling within fill and natural soils and one round of groundwater sampling from the three newly constructed groundwater monitoring bores; and ▪ Review of the results to determine if additional sampling was warranted. Additional investigations and/or remediation would be considered warranted where soil and/or groundwater concentrations exceeded the criteria relevant to the proposed land use(s), as endorsed by the EPA.	▪ Drilling terminated at BH7, BH12, BH16 and BH19 due to auger refusal on bedrock. Natural soils were not accessible for sampling at borehole location BH7. ▪ Leachate (TCLP) analysis was conducted on the following soil sampling locations to determine specific chemical leachability: › Total Chromium: BH10; › Lead: BH2M, BH4, BH8and BH9. › Nickel: BH10. › BaP: BH2M, BH4, BH6, and BH9.

5.3 Data Quality Indicators (DQI)

To ensure that the investigation data were of an acceptable quality, it was assessed against the data quality indicators (DQI) outlined in **Table 5-2**.

Table 5-2 Data Quality Indicators

QA/QC Measure	Data Quality Indicators
Precision – A quantitative measure of the variability (or reproducibility) of data	Data precision was assessed by reviewing blind field duplicate sample sets, through calculation of relative percentage differences (RPD), as well as laboratory (matrix spike) duplicates. Data precision was deemed acceptable if RPDs were less than 30%. RPDs that exceed this range were considered acceptable where: ▪ Results were <10 times the limits of reporting (LOR); ▪ Results were <20 times the LOR and the RPD was less than 50%; or ▪ Heterogeneous materials or volatile compounds were encountered.
Accuracy – A quantitative measure of the closeness of reported data to the "true" value	Data accuracy was assessed through the analysis of: ▪ Split field duplicates (via RPDs as per blind field duplicates); ▪ Trip blank and spike samples; ▪ Method blanks, analysed for the COPC targeted in the primary samples; ▪ Matrix spike and matrix spike duplicate sample sets; and ▪ Laboratory control samples.
Representativeness – The confidence (expressed qualitatively) that data are representative of each medium present onsite	To ensure the data produced by the laboratory were representative of conditions encountered in the field, the following measures were adopted: ▪ Blank samples, run in parallel with field samples to confirm there were no unacceptable instances of laboratory artefacts; ▪ Review of RPD values for laboratory duplicates to provide an indication that the samples were generally homogeneous, with no unacceptable instances of significant sample matrix heterogeneities; and ▪ The appropriateness of collection methodologies, handling, storage and preservation techniques was assessed to ensure/confirm there was minimal opportunity for sample interference or degradation (i.e. volatile loss during transport due to incorrect preservation / transport methods).
Completeness – A measure of the amount of useable data from a data collection activity	Analytical data sets acquired during the DSI were evaluated as complete, upon confirmation that: ▪ Standard operating procedures (SOPs) were adhered to; and ▪ All COC documentation was properly completed and received. It could then be considered whether the proportion of "useable data" was sufficient for the purposes of the land use assessment.
Comparability – The confidence that data were equivalent for each sampling and analytical event	Issues of comparability between data sets were reduced through adherence to standard operating procedures (SOPs) and regulator-endorsed guidelines. In addition, the data were collected by experienced samplers and NATA-accredited laboratory methodologies were employed for all laboratory testing programs.

5.4 Sampling Rationale

With reference to the CSM described in **Section 5**, soil and groundwater investigation works were planned in accordance with the following rationale:

- Sampling *in-situ* fill and natural soils from 20 locations (BH1-BH20), located across accessible parts of the site, in compliance with EPA guidance on sampling design (Ref. NSW EPA, 2022);
- Sampling groundwater by way of a single groundwater monitoring event (GME), from three newly installed groundwater monitoring wells BH2M and BH18M located close to the downgradient (west) boundary and BH20M located close to the upgradient (east) boundary; and
- Laboratory analysis of representative soil and groundwater samples for the identified potential contaminants.

5.5 Investigation Constraints

As natural materials were encountered at shallow depth at test bore BH7 (natural sandy clay), BH12 and BH19 (auger refusal on sandstone bedrock), these bores were terminated before the target investigation depth was reached.

Given that site filling was absent at these locations, however, this was not considered to represent an investigation constraint.

5.6 Assessment Criteria

The assessment criteria adopted for this project are outlined in **Table 5-3** and **Table 5-4**. These were selected from available published guidelines that are endorsed by national or state regulatory authorities, with due consideration of the exposure scenario that is expected for various parts of the site, the likely exposure pathways and the identified potential receptors.

As the proposed development (**Section 1.2**) involves the construction of four, multi-storey buildings (Buildings A-D) comprising apartments and retail tenancy (mixed-use) with gardens, deep soil landscaping, communal areas, a two and a half-level basement and a child care facility situated on ground floor above the basement, the criteria outlined below were applied for the Tier 1 screening assessment of analytical results, in accordance with NEPC (2013) Schedule B4.

Table 5-3 Adopted Investigation Levels for Soil and Groundwater

Environmental Media	Assessment Criteria	Rationale
Soil	NEPM, 2013 Soil HILs, EILs, HSLs, ESLs & Management Limits for TRHs	**Soil Health-based Investigation Levels (HILs)** Soil samples collected from the site have been assessed against the following NEPC (2013) Schedule B1 land use criteria: ▪ Child Care Areas: HIL A – Residential with accessible soil, including childcare centres (Ref. Table 1A(1) in Sched. B1); and ▪ Building Footprints and Setback Areas (excluding child care areas): HIL B – Residential with minimal access to soil, based on the partial, high density residential use of the site.
	NSW EPA 2014 Waste Classification Guidelines	**NSW EPA 2014 Waste Classification Guidelines** All soils located within the proposed basement footprint area will be subject to bulk excavation as part of basement construction. All tested samples from within the basement footprint will therefore be assessed against the relevant waste threshold concentrations for offsite disposal purposes. *Note:* Additional samples will probably be required to complete the waste classification process, once the final bulk excavation volume is known. The DSI results therefore provide preliminary waste classifications, for guidance purposes.

Environmental Media	Assessment Criteria	Rationale
		Soil Health-based Screening Levels (HSLs) for vapour intrusion Soil samples collected from the site have been assessed against the following NEPC (2013) Schedule B1, Table 1A(3) HSLs for vapour intrusion in relation to volatile organic compounds: : ▪ Residential Areas: HSL A/B – Low to high-density residential; and **Health Screening Levels for asbestos contamination in soil** HSL A, B, C and D assessment criteria for asbestos (Ref. NEPC 2013, Schedule B1, Table 7). **Ecological Investigation and Screening Levels (EILs/ESLs)** Tested soil samples were also assessed against the NEPC (2013) *NEPM Schedule B1,* EILs for urban residential and commercial/industrial settings for arsenic, copper, chromium (III), nickel, lead, zinc, DDT and naphthalene, for protection of terrestrial ecosystems. A summary of the calculated and adopted EIL/ESL values applicable for the site is provided in **Table 5-4**. **Management Limits for Petroleum Hydrocarbons** Should the ESLs and HSLs be exceeded for petroleum hydrocarbons, soil samples from across the site would also be assessed against the NEPC (2013) Schedule B1 *Management Limits* for the TRH fractions F1 – F4 to assess propensity for phase-separated hydrocarbons (PSH), fire and explosive hazards and potential adverse effects on buried infrastructure.
Groundwater	NEPM, 2013 GILs for Fresh Waters and HSLs for Vapour Intrusion	**Groundwater Investigation Levels (GILs) for Marine Water** The ANZG 2018 default guideline value (DGV) for typical, highly disturbed aquatic ecosystems at the 90% level of protection was deemed appropriate given the highly disturbed nature of the receiving water body; however, the 99% DGVs were applied for the bio-accumulative metals cadmium and mercury. The marine water criteria were considered relevant as the closest surface water receptor was Parramatta River (which is tidally influenced with mangroves present in the foreshore areas), and is located around 250m west of the site. **Groundwater Health-Based Screening Levels (HSLs)** The NEPM 2013 groundwater HSLs for vapour intrusion were also used to assess for potential human health impacts from residual vapours resulting from petroleum, BTEX and naphthalene impacts. The HSL-A&B thresholds for low to high density residential sites were applied.

For the purposes of this investigation, the adopted site specific criteria are presented alongside the analytical results in the corresponding results summary tables in **Appendix B**.

Table 5-4 Generic and Derived Ecological Investigation/Screening Levels

Contaminant	Assumed Values	EIL or ESL (mg/kg) [1]	
		Urban residential & public open space	Commercial & Industrial
Arsenic	Fill (Sand) and Natural (Sand): Generic EIL assuming aged arsenic contamination (i.e.	100	160

Contaminant	Assumed Values	EIL or ESL (mg/kg) [1]	
	>2years) in soil		
Copper	Fill (Sand) and Natural (Sand): Generic EIL assuming a cation exchange capacity of 10 $cmol_c/kg$, soil pH of 5.5, organic carbon of 2%, aged contamination, in area of high traffic in NSW	160	220
DDT	Fill (Sand) and Natural (Sand): Generic EIL for aged contamination, in area of high traffic in NSW	180	640
Lead	Fill (Sand) and Natural (Sand): Generic EIL for aged contamination, area of high traffic in NSW	1,260	1,800
Naphthalene	Fill (Sand) and Natural (Sand): Generic EIL for aged contamination, area of high traffic in NSW	170	370
Nickel	Fill (Sand) and Natural (Sand): Generic EIL assuming a cation exchange capacity of 10 $cmol_c/kg$, aged contamination, in area of high traffic in NSW	170	290
Zinc	Fill (Sand) and Natural (Sand): Generic EIL assuming a cation exchange capacity of 10 $cmol_c/kg$, soil pH of 5.5, aged contamination, in area of high traffic in NSW	390	540
Chromium (III)	Fill (Sand) and Natural (Sand): Generic EIL assuming a cation exchange capacity of 10 $cmol_c/kg$, soil pH of 5.5, aged contamination, in area of high traffic in NSW	410	680
TRH – F1 C6 – C10 (less BTEX)	All ESLs shown are for coarse-grained soils and have low reliability apart from those marked with, * which have moderate reliability.	180*	215*
TRH – F2 >C10-C16 (less Naphthalene)		120*	170*
TRH – F3 >C16-C34		300	1,700
TRH – F4 >C34-C40		2,800	3,300
Benzene		50	75
Toluene		85	135
Ethylbenzene		70	165
Xylenes		105	180
Benzo(a)pyrene		33[2]	33[2]

Note 1 NEPC (2013) NEPM *Schedule B1*, EILs/ESLs for both urban residential and commercial/industrial settings
Note 2 Benzo(a)pyrene criteria based on CRC Care Technical Report No. 39, 'Risk-based management guidance for benzo(a)pyrene' (2017).
Note 3 All ESLs shown are for coarse-grained soils and have low reliability apart from those marked with, * which have moderate reliability.

5.7 Soil Investigation

Soil investigation works conducted at the site are described in **Table 5-4**. Test bore locations are illustrated in **Figures 2 and 3** (**Appendix A**).

Table 5-5 Summary of Soil Investigation Methodology

Activity/Item	Details
Fieldwork	The intrusive investigations, with soil profile logging and sampling was conducted on 22 March 2022. Prior to commencement, the site services were surveyed by a qualified services locator. Review of DBYD was also performed.
Drilling Methods	Test bores were drilled using a ute-mounted drill rig, fitted with solid flight augers. Borehole construction details are presented in the detailed logs attached in **Appendix E.** Final borehole depths across the site ranged from a minimum of 0.3 mBGL to a maximum of 0.4mBGL (terminating on extremely weathered sandstone at BH19) to a maximum of 9.0 mBGL at BH2M, which was completed as a groundwater monitoring well, as described in **Section 5.8**.
Soil Cuttings	Soil cuttings were used as backfill for completed boreholes (not converted to monitoring wells).
Soil Logging	Drilled soils were classified by field-based visual/tactile methods with respect to lithological characteristics based on Australian Standard (AS) 1726 – 2017, as noted in the logs presented in **Appendix E**. This included sample evaluation on a qualitative basis for odour and visual signs of contamination.
Sample Collection	▪ Soil samples were collected using a dry grab method (unused, dedicated nitrile gloves) and placed into laboratory-supplied, acid-washed, solvent-rinsed glass jars. ▪ A blind field QC duplicate was spilt from each primary soil sample and placed into a fresh glass jars for laboratory chemical suite analysis. ▪ Duplicate material was split from each sample collected from the fill layer and placed into a zip-lock bag for laboratory asbestos analysis.
Decontamination Procedures	*Drilling Equipment* - Samples were collected from different parts of the solid flight auger and the auger was cleared of all residual soil between each borehole location. *Sampling Equipment* - Nitrile sample gloves were replaced between each sampling location.
Sample Preservation and Transport	Samples were stored in insulated chests containing ice 'bricks' whilst on-site and in transit to the contracted, primary analytical laboratory (SGS Environmental Services, SGS). Transport was performed under strict chain-of-custody (COC) conditions. Copies of the COC documentation (used to track sample movements) and laboratory sample receipt advice (SRA) forms are provided in **Appendix J**.
Laboratory Analysis and Quality Control (QC)	The soil samples were analysed by SGS for the potential contaminants listed in **Section 4.5**. All analyses were performed within the required holding periods, as documented in the laboratory reports (**Appendix K**). QC testing comprised an intra-laboratory ('blind field') duplicate, a rinsate blank, a trip blank and a trip spike, all tested by SGS, as well as an inter-laboratory ('split field') duplicate sample tested by Envirolab Services Pty Ltd (Envirolab).

5.8 Groundwater Investigation

The groundwater investigation works conducted at the site are described in **Table 5-5**. Monitoring well locations are illustrated in **Figures 2 and 3**.

Table 5-6 Summary of Groundwater Investigation Methodology

Activity/Item	Details
Fieldwork	Three groundwater monitoring wells (BH2M, BH18M and BH20M) were installed at upgradient and downgradient locations across the site on 22 March 2022. The three newly installed wells were subsequently developed to remove any additional water and/or seepage immediately after well construction. Water level gauging, well purging, field testing and initial groundwater sampling was conducted on 29 March 2022.
Well Construction	Drilled by HartGeo Pty Ltd using a ute-mounted, mechanical, solid flight auger drill rig, three soil investigation bores were converted to groundwater monitoring wells as follows: ▪ One, 9 m deep well identified as BH2M; ▪ One, 9 m deep well identified as BH18M; and ▪ One, 8 m deep well identified as BH20M. All wells were seated within bedrock and the water intake screen interval in each well was installed across the weathered sandstone. Well construction details are tabulated in **Section 6.8** and documented in the bore logs presented in **Appendix E**.
Well Construction Standards	Well construction was in general accordance with the standards described in NUDLC, 2012 and involved the following: ▪ 50 mm, Class 18 uPVC, threaded, machine-slotted screen and casing, with slotted intervals set to screen to at least 500 mm above the standing water level to allow sampling of phase-separated hydrocarbon product, if present; ▪ Base and top of each well was sealed with a uPVC cap; ▪ Annular, graded sand filter was used to approximately 300 mm above top of screen interval; ▪ Granular bentonite was applied above annular filter to seal the screened interval; ▪ Drill cuttings were used to backfill the bore annulus to just below ground level; and ▪ Surface completion comprised a steel road box cover set in neat cement and finished flush with the concrete slab level.
Well Development	Well development was conducted for each well directly following installation. This involved agitation within the full length of the water column using a HDPE disposable bailer. Pumping was continued until no further water remained in the well and/or the water was clear.
Well Gauging	The monitoring wells were gauged for standing water level (SWL, depth to groundwater) prior to well purging at the commencement of the groundwater monitoring event (GME) on 29 March 2022. The measured SWLs were interpreted with surveyed wellhead elevations to inform interpretation of groundwater flow direction, as discussed in **Section 8.2**.

Activity/Item	Details
Well Purging & Field Testing	The monitoring wells were purged using the low-flow/minimal draw-down sampling method with a MicroPurge™ (MP15) sampling kit and a portable MicroPurge pump following well gauging. The MicroPurge system incorporates a low density poly-ethylene (LDPE) pump bladder, and a LDPE sample delivery tube. The system used for this investigation employed pressurised carbon dioxide gas to regulate groundwater flow. Pump pressure and pumping cycles were adjusted accordingly to regulate extraction flow rate, and to avoid causing excessive drawdown of water level during the sampling process. Field measurement of water quality parameters was conducted continuously on purged groundwater with a water quality meter (Hanna™ Multi Parameter 9829) positioned within an open flow-through cell. Groundwater parameters tested in the field were Dissolved Oxygen (DO), Electrical Conductivity (EC), Redox, Temperature and pH. The measured parameters were recorded onto field data sheets (**Appendix E**), along with the purged water volume at the time of measurement. Groundwater sampling was performed when three consecutive readings of groundwater parameter indicated stabilisation; as per the specified ranges detailed below: ▪ Electrical Conductivity: ± 3% of the display value; ▪ Redox: ± 20 mV; ▪ DO: ± 20% of the display value; ▪ pH: ± 0.2 pH unit; and ▪ Temperature: ± 0.2°C Total water volume purged and stabilised groundwater parameters at each monitoring well are summarised in **Section 8.2**.
Decontamination Procedure	▪ The HDPE (PFAS free) bailers were discarded after each sample, therefore did not require decontamination. A PFAS-free decontamination solution was used on the stainless steel bailer cable prior to use at each location. ▪ The water level probe, water quality kit probes and MicroPurge were washed in a solution of potable water and Decon 90 and then rinsed with potable water between measurements/wells. ▪ All sample containers were supplied by the laboratory for the particular project and only opened once, immediately prior to sampling. ▪ Ice was used to keep the samples cool, all melt water was continuously drained from the insulated sample chest. Ice was replaced regularly.
Sample Preservation	Sample containers were supplied by the laboratory with the following preservatives: ▪ One, 1 litre amber glass, acid-washed and solvent-rinsed bottle; ▪ Two, 40ml glass vials, pre-preserved with dilute hydrochloric acid, Teflon-sealed; ▪ One, 250mL, HDPE bottle, pre-preserved with dilute nitric acid (1 mL); ▪ One HDPE bottle for PFAS analysis, with no Teflon™ lined lid; and ▪ One, 1L HDPE, un-preserved bottle (for *organotin* analysis). Samples for metals analysis were field-filtered using 0.45 µm pore-size, dedicated membrane filters. All containers were filled with sample to the brim then capped and stored in ice-filled chests, until completion of the fieldwork and during sample transit to the laboratory.

Activity/Item	Details
Quality Control, Laboratory Analysis, & Sample Transport	All groundwater samples were submitted for analysis of previously-identified potential chemicals by SGS Australia (SGS, the primary laboratory). QA/QC testing comprised intra-laboratory duplicates ('field duplicates') tested blind by SGS and an inter-laboratory field duplicate tested blind by Envirolab (the secondary laboratory). For PFAS analysis, samples were submitted for analysis to Eurofins (Primary Laboratory) and an inter lab duplicate was tested by Envirolab. All samples were transported under strict Chain-of-Custody (COC) conditions, and COC certificates and laboratory sample receipt documentation were provided to EI for confirmation purposes. A Sample Receipt Advice (SRA) form was provided by each laboratory to document sample condition upon receipt. Copies of SRA forms and COC certificates are presented in **Appendix J**.

6. DATA QUALITY ASSESSMENT

6.1 Data Quality Assessment

The assessment of data quality is defined as the scientific and statistical evaluation of environmental results to determine if the data meet the objectives of the project (Ref. USEPA, 2006). For this DSI, data quality assessment involved an evaluation of the compliance of the field sampling and laboratory analytical procedures with established protocols and an assessment of the accuracy and precision of the associated results from the quality control measures. The findings are summarised in **Table 6-1** and discussed in **Appendix L**.

Table 6-1 Quality Control Process

Stage	Control	Conformance [Yes, Part, No]	Report Section(s)
Preliminaries	DQOs established	Yes	See **Section 5**
Field work	Suitable documentation of field observations, including borehole logs.	Yes	See **Appendix E**
Sampling Plan	Use of relevant and appropriate sampling plan (density, type, and location)	Yes	See **Sec 5.4** Sampling Rationale
	All media sampled and duplicates collected	Yes	See **Appendix J**
	Use of approved and appropriate sampling methods (soil)	Yes	See **Section 5.7**
	Selection of soil samples according to field PID readings (where VOCs are present)	Part	Volatile odours were not detected, See **Section 7.1.2**
	Preservation of samples upon collection and during transport to the laboratory	Yes	See **Section 5.7**
	Appropriate rinsate, field and trip blanks	Yes	See **Section 5.7**
	Completed field and analytical laboratory sample COC procedures and documentation	Yes	See **Appendix J**
Laboratory	Sample holding times within acceptable limits	Yes	See laboratory SRA in **Appendix J**
	Use of appropriate analytical procedures and NATA-accredited laboratories	Yes	See **Appendix K** and **Appendix L**
	LOR/PQL low enough to meet adopted criteria	Yes	See **Appendix K** and **Appendix L**
	Laboratory blanks	Yes	See **Appendix K** and **Appendix L**
	Laboratory duplicates	Yes	See **Appendix K** and **Appendix L**
	Matrix spike/matrix spike duplicates (MS/MSDs)	Yes	See **Appendix K** and **Appendix L**
	Surrogates (or System Monitoring	Yes	See **Appendix K** and

Stage	Control	Conformance [Yes, Part, No]	Report Section(s)
	Compounds)		**Appendix L**
	Analytical results for replicated samples, including field and laboratory duplicates, expressed as RPD	Yes	See **Appendix K** and **Appendix L**
	Checking for the occurrence of apparently unusual or anomalous results (e.g. laboratory results that appear to be inconsistent with field observations or measurements)	Yes	See **Appendix L**
Reporting	Report reviewed by senior staff to assess project meets desired quality, EPA guidelines and project outcomes.	Yes	See Report Distribution page sign-off at front of report

6.2 Quality Overview

On the basis of the validation procedure employed, the overall quality of the analytical data produced for the site was considered to be of an acceptable standard for interpretive use and preparation of an updated CSM.

7. RESULTS

7.1 Soil Investigation Results

7.1.1 Subsurface Conditions

The site lithology encountered during the drilling of the test boreholes was generalised as a layer of asphalt (at some locations), followed by fill (to a maximum depth of 1.1m BGL), overlying natural, residual clays and bedrock at depth. A summary of the borehole log information is presented in **Table 7-1**. The borehole logs are attached in **Appendix E**.

Table 7-1 Generalised Subsurface Profile

Layer	Description	Minimum and Maximum Depth (m BGL)
Asphalt[3]	BH11, BH12, BH15 & BH17	0.00-0.05
Fill	Silty CLAY Sandy GRAVEL Clayey GRAVEL	0.00-1.10 0.00-0.10 0.05-0.10
Natural Soils	Sandy CLAY	0.00-1.50
Bedrock[2]	SANDSTONE	0.30-2.00+

Note 1 + Denotes the material was detected at the termination depth and likely to extend deeper.
Note 2 Sandstone bedrock was only encountered within the drilling depths of BH2M, BH18M and BH20M.
Note 3 Asphalt was only encountered at BH11, BH12, BH15 and BH17.

7.1.2 Field Observations and PID Results

Soil samples of fill and natural soil were obtained from the bores at various depths ranging between 0.05-1.20m BGL. All examined soil samples were evaluated on a qualitative basis for odour and visual signs of contamination (e.g. hydrocarbon odours, oil staining, petrochemical filming, asbestos fragments, ash, and charcoal) and the following observations were noted:

- Neither hydrocarbon odours nor sheen were detected in soil at any sampling location;
- Foreign materials (i.e. metal, brick, timber, plastic, concrete, terracotta) were not observed in soil at any sampling location;
- Evidence of ash and slag materials were not observed in soil at any sampling location;
- Asbestos containing materials (i.e. fragments) were not observed in soil at any sampling location;
- No visible evidence of potential or actual ASS (such as pale yellow deposits/coatings of jarosite), was observed in any bore during drilling works; and
- Groundwater inflow (water strike) was observed at 6.5m and 7.0m BGL at BH18M and BH20M, respectively. Groundwater inflow was not observed during construction of BH2M.

7.2 Groundwater Field Results

7.2.1 Monitoring Well Construction

The construction details for the groundwater monitoring wells BH2M, BH18M and BH20M are summarised in **Table 7-2**.

Table 7-2 Monitoring Well Construction Details

Well ID	Well Depth (mBGL) [1]	[2] Well Stick up / Stick down (m)	Screen Interval (mBGL)	Lithology Screened
BH2M	9.0	-0.1	6.00-9.00	Bedrock: Sandstone
BH18M	9.0	-0.1	6.00-9.00	Bedrock: Sandstone
BH20M	8.0	+1.07	5.00-8.00	Bedrock: Sandstone

Note 1 mBGL - metres below ground level.
Note 2 top of well casing (cap removed) Stick up (+) m above ground level, or Stick down (-) m below ground level.

7.2.2 General Observations and Field Meter Results

A single GME was conducted on three wells on 29 March 2022. On this date, standing water levels (SWLs) were measured within each well prior to well purging, the results of which were recorded with well purge volumes and field-based water test results. A summary of the recorded field data is presented in **Table 7-3** and copies of the completed field data sheets are included in **Appendix E**.

The field data indicated that the local groundwater was acidic (pH: 3.70-5.78) and fresh to brackish in terms of water salinity (EC 242 to 2,200 µS/cm), and oxidising (positive Redox). Standing water levels (adjusted for stick-up/down) ranged between 2.09m (BH2M) and 3.21m (BH18M) BGL.

Table 7-3 Groundwater Field Data

Well ID	SWL (mBTOC)	Stick up/down (m)	DO (mg/L)	pH	EC (µS/cm)	Temp (°C)	Redox (mV)	Comments
BH2M	1.99	-0.1	0.07	5.78	2200	23.04	345.2	▪ Low turbidity ▪ Pale grey ▪ No odour ▪ No sheen
BH18M	3.11	-0.1	5.83	3.70	242	22.89	388.1	▪ Low turbidity ▪ Clear to pale grey ▪ No odour ▪ No sheen
BH20M	1.99	+1.07	4.82	4.90	997	23.64	283.6	▪ Low turbidity ▪ Pale grey ▪ No odour ▪ No sheen

SWL – Standing Water Level (measured prior to well purging).
mBTOC – metres below top of well casing.
Stick up / down – TOC to ground level in metres above (+) or below (-) ground level
DO – Dissolved Oxygen, measured in units of milligrams per litre (mg/L)
EC – Electrical Conductivity, measured in units of micro Siemens per centimetre (µS/cm).
Redox – Reduction Oxidation Potential. Value shown was corrected for standard hydrogen electrode by adding 205 mV to field reading, per manufacturer specifications.
All field groundwater quality parameters were tested onsite at the time of sampling.

7.3 Laboratory Analytical Results

7.3.1 Soil Analytical Results in Relation to Land Use Criteria

A summary of the laboratory results for the tested (representative) soil samples, with number of analyses, minimum/maximum concentrations and highlighting samples found to exceed the SILs, is presented in **Table 7-3**. More detailed tabulation, with individual sample concentrations alongside the adopted soil criteria, is presented in **Appendix B**, **Table B1**. The corresponding detailed laboratory analytical reports are presented in **Appendix K.**

Table 7-3 Summary of Soil Analytical Results

Number of samples	Analyte	Minimum Concentration (mg/kg)	Maximum Concentration (mg/kg)	Sample(s) Exceeding SILs
Heavy Metals				
30	Arsenic	<1	14	None
35	Cadmium	<0.3	0.4	None
35	Total Chromium	3	100	None
35	Copper	<0.5	41	None
35	Lead	4	550	**BH2M_0.4-0.5** (exceeding HIL-A criteria)
35	Mercury	<0.05	0.68	None
35	Nickel	<0.5	81	None
35	Zinc	<2	360	None
PAHs				
30	Naphthalene	<0.1	0.5	None
30	Benzo(a)pyrene	<0.1	8.5	None
30	Carcinogenic PAHs (as B(a)P TEQ)	<0.3	13	**BH2M_0.4-0.5, BH3_0.2-0.3, BH4_0.7-0.8, BH6_0.2-0.3, BH9_0.7-0.8, BH14_0.1-0.2, BH19_0.05-0.1 and BH20M_0.1-0.2** (exceeding HIL-A, HIL-B)
30	Total PAH	0.8	120	None
BTEX				
30	Benzene	<0.1	<0.1	None
30	Toluene	<0.1	<0.1	None
30	Ethyl benzene	<0.1	<0.1	None
30	Xylenes (total)	<0.3	<0.3	None
TRHs				
30	F1	<25	<25	None
30	F2	<25	33	None
30	F3	<90	540	**BH4_0.7-0.8, BH9_0.7-0.8, BH15_0.2-0.3** (Site specific Residential ESLs)

Number of samples	Analyte	Minimum Concentration (mg/kg)	Maximum Concentration (mg/kg)	Sample(s) Exceeding SILs
30	F4	<120	290	None
Pesticides				
21	OCPs	<1	<1	None
21	OPPs	<1.7	<1.7	None
PCBs				
21	Total PCBs	<1	<1	None
Asbestos				
21	Presence/Absence	None	None	None

7.3.2 Soil Analytical Results in Relation to Waste Classification Guidelines

A summary of the laboratory analytical results for the tested soil samples collected from the footprint area of the proposed basement is presented in **Table B3** in **Appendix B**, which includes the threshold concentrations for the *General Solid Waste* and *Restricted Solid Waste* categories, as detailed in the NSW EPA 2014 Waste Classification Guidelines. The results are summarised from the same laboratory reports referenced above.

Table B3 also includes the samples tested within the deep soil areas surrounding the proposed child care centre, to provide a preliminary, indicative waste classification for the lead-impacted and carcinogenic PAH-impacted fill soils in that part of the site.

Leachability analysis using the toxicity characteristics leaching procedure (TCLP) was also conducted on the soil samples listed below, which reported elevated concentrations. Laboratory results reported low leachability, as follows:

- TCLP Chromium: BH10_0.05-0.1 (<0.005 mg/L);
- TCLP Lead: BH2M_0.4-0.5 (0.30mg/L); BH4_0.7-0.8 (0.06mg/L); BH8_0.1-0.2 (0.06mg/L); and BH9_0.7-0.8 (0.21mg/L);
- TCLP Nickel: BH10_0.05-0.1 (0.29mg/L); and
- TCLP BaP: BH2M_0.4-0.5 (<0.1mg/L); BH4_0.7-0.8 (<0.1mg/L); BH6_0.2-0.3 (<0.1mg/L); and BH9_0.7-0.8 (0.3mg/L).

All leachability tests showed material met the specific contaminant concentration (SCC1) threshold and TCLP1 threshold for *General Solid Waste*, except for BH9_0.7-0.8, which showed results that indicate exceedance of *Restricted Solid Waste*. It is expected that upon additional testing a more accurate waste classification can be determined. However, this will require more TCLP testing of BaP, and sufficient sampling frequency to meet the minimum sampling density in accordance with NSW EPA 2014 Waste Classification Guidelines.

The final waste classification for bulk excavated soils from the basement footprint area and impacted fill soils to be remediated from the areas surrounding the childcare centre, will be determined as part of the remediation stage, as outlined in **Section 10**.

In summary, the following preliminary waste classifications are expected:

Basement footprint area soils

- *General Solid Waste (Non-putrescible):* excavated fill soils from most parts of the proposed basement footprint area; and

- *Virgin Excavated Natural Material (VENM) / General Solid Waste (Non-putrescible)*: excavated natural soils from all parts of the proposed basement footprint area.

Further sampling and testing is required to enable final waste classification of bulk excavated basement soils, particularly in the vicinity of test bore BH9 where an elevated BaP concentration was reported in initial samples, in excess of the SCC1 and TCLP1 thresholds.

Childcare Centre soils

Based on the DSI results for the fill soils impacted with lead and carcinogenic PAHs in the proposed deep soil areas to the east, south and west of the childcare centre, a preliminary waste classification of *General Solid Waste (Non-putrescible)* is expected. As for bulk excavated soils, however, additional waste classification sampling and testing is required to confirm the final waste classification of the final excavated materials.

7.3.3 Groundwater Analytical Results

A summary of the laboratory analytical results for the tested groundwater samples is presented in **Table 7-4**. Groundwater results are summarised in **Table B2** in **Appendix B**, which includes the adopted GILs. Completed documentation used to track groundwater sample movements and laboratory receipt (i.e. COC and SRA forms) are copied in **Appendix J** and all laboratory analytical reports for tested samples are presented in **Appendix K**.

Table 7-4 Summary of Groundwater Analytical Results

No. of primary samples	Analyte	Min. Conc. (µg/L)	Max. Conc. (µg/L)	Sampling location exceeding GILs
Petroleum-related Hydrocarbons				
3	TRH - F1	<50	<50	None
3	TRH - F2	<60	84	None
3	TRH - F3	<500	<500	None
3	TRH - F4	<500	<500	None
3	Benzene	<0.5	<0.5	None
3	Toluene	<0.5	<0.5	None
3	Ethyl benzene	<0.5	<0.5	None
3	Total xylenes	<0.5	<0.5	None
PAHs				
3	Total PAH	<1	<1	None
3	Benzo(a)pyrene	<0.1	<0.1	None
3	Naphthalene	<0.1	<0.1	None
Metals				
3	Arsenic	<1	1	None
3	Cadmium	<0.1	<0.1	None
3	Chromium	<1	<1	None
3	Copper	<1	3	Groundwater at **BH20M** was at the marine water GIL of 3µg/L
3	Lead	<1	<1	None
3	Mercury	<0.01	<0.01	None
3	Nickel	1	6	None

No. of primary samples	Analyte	Min. Conc. (µg/L)	Max. Conc. (µg/L)	Sampling location exceeding GILs
3	Zinc	22	57	Groundwater exceeded the marine GIL of 23µg/L at **BH2M** (24µg/L) and **BH20M** (57µg/L)

8. SITE CHARACTERISATION

8.1 Soil Characterisation

Fill was observed at most assessed locations to a maximum depth of 1.1m BGL, with the exception of borehole BH7 where natural sandy clay was observed at ground level. No odours or staining were observed in any soil samples. No foreign materials or any other visual signs of contamination (including potential asbestos containing materials), were identified within the soil investigation bores or on any other part of the site. It was noted however that much of the site surface was covered with asphalt. This was considered to be a potential source of the carcinogenic PAHs found in shallow fill soils (see **Section 7.3.1**), as reported in the laboratory analytical results.

Laboratory analyses indicated that concentrations of potential contaminants in fill and underlying natural soil were below the most conservative human health criteria (*HIL-A* and *HSL-A&B*) and ecological criteria (EIL/ESL – Residential), with the exception of localised areas impacted with the metal lead, carcinogenic PAHs, and total recoverable hydrocarbons fraction TRH (F3).

Further comments in relation to the reported soil results are provided with due regard for the proposed land use variations across the site, as follows:

8.1.1 Soils within the Basement Footprint Area

Soils in the proposed basement footprint area will be excavated and removed from the site to enable the construction of the basement car park. Based on investigation results for this DSI, the excavated soils are expected to be categorised into two separate waste streams, as follows:

- Fill soils classified as *General Solid Waste (Non-putrescible);* and
- Natural soils classified as *General Solid Waste (Non-putrescible)* and *VENM*.

The above waste classifications are only preliminary at this stage. Further sampling and testing will be required to provide sufficient data for final waste classification, in compliance with the NSW EPA 2014 Waste Classification Guidelines based on the actual volumes of excavated materials to be removed for offsite disposal.

It is noted that VENM removed from the bulk excavated basement may be suitable for reuse to backfill the remediated deep soil areas in the vicinity of the childcare centre in the southern part of the site. The procedure for soil validation and use as backfill will need to be detailed in the remedial action plan, as outlined in **Section 10**.

8.1.2 Soils Surrounding the Childcare Centre

Soils within the setback areas, to the east, south and west of the proposed basement footprint area were found to be impacted with lead, carcinogenic PAHs and TRH (F3). BH2M, where a lead concentration in excess of the HIL A criteria was reported, is within the area proposed as the outdoor play area for the childcare centre. In addition, exceedances in relation to carcinogenic PAHs were reported at BH3, BH4 and BH6, which indicate that most setback soils in the vicinity of the childcare centre are impacted. It would be prudent therefore to undertake soil remediation in this part of the site to ensure that users of the childcare centre are not exposed to lead-impacted soils. Further recommendations are provided in **Section 10**.

Due to the childcare centre use of this part of the site, soil remediation is required to prevent exposure risk to contamination. Based on investigation results for this DSI, the excavated soils from the setback areas are expected to be categorised as *General Solid Waste*. This is a

preliminary waste classification and will require final waste classification, in compliance with the NSW EPA 2014 Waste Classification Guidelines based on the actual volumes of excavated materials to be removed for offsite disposal.

8.1.3 Soils in Remaining Setback Areas

With reference for **Figure 2** (**Appendix A**), it was noted that no samples were collected from within the setback areas, north of the childcare centre. If it is assumed that the samples collected from the edges of the proposed basement footprint area are representative of the quality of the soils located between the basement and the site boundaries, it would appear that setback areas comply with the HIL B soil criteria for residential settings with minimal accessible soils, excluding BH9, BH14, BH19, and BH20M which had Carcinogenic PAHs exceedances..

Given the presence of elevated lead and carcinogenic PAHs in the southern setback soils located to the east, south and west of the childcare centre however, it would be prudent to undertake supplementary investigation of setback soils in the northern part of the site as part of a data gap closure investigation. This can be done prior to preparation of the remedial action plan (RAP) or as part of the site remedial stage. Should any additional impacted soils be identified during the data gap investigations, these may be included with the childcare centre setback soils for remediation, and should be incorporated into the RAP, in compliance with NSW EPA guidance.

8.1.4 Preliminary Waste Classification

As discussed in Sections 7.3 and 8.1 the site soils sampled appear to fit the *General Solid Waste (Non-putrescible*) Classification; however further assessment is needed to confirm that localised elevated PAHs within the localised area of BH9 do not trigger a higher waste classification. Notwithstanding, greater certainty is required in addition to increasing sampling frequency for compliance with the relevant NSW EPA guidelines.

It is proposed that the final Waste Classification may be achieved as part of a data gap closure investigation, which would include additional samples and TCLP testing for BaP.

8.2 Groundwater Characterisation

With reference to **Table B2** in **Appendix B**, all three groundwater samples showed concentrations that were below the adopted groundwater criteria for most analytical parameters, with the exception of the metals copper and zinc, which were detected at the maximum concentrations of 3 µg/L for copper and 57 µg/L for zinc.

These results were not deemed to be a cause for concern for the following reasons:

- Exceedances of the ANZG (2018) adopted water criteria is a common occurrence in the Sydney Basin region as background concentrations for copper and zinc typically elevated due to natural levels.
- Due to the widespread natural occurrence of these two specific metals in the Sydney region, it is generally accepted that concentrations that are one order of magnitude (i.e. 10 times) higher than the respective ANZG (2018) default guideline value, are acceptable. Allowing for regional groundwater conditions therefore, 30 µg/L for copper and 230 µg/L for zinc, would be appropriate GILs for groundwater assessment purposes. Groundwater copper and zinc sampled at the site are significantly below these levels.
- Given the site history, low concentrations of metals reported in fill and natural soil and the consistent concentration of low level detections in groundwater at all three monitoring wells there is no evidence of contribution from the site to metal concentrations in the groundwater system.

It was therefore concluded that groundwater copper and zinc concentrations reported for the site do not present an environmental risk to potential environmental receptors.

8.3 Review of Conceptual Site Model

On the basis of the DSI findings, the updated CSM discussed in **Section 4** was considered to appropriately identify contamination sources, migration mechanisms and exposure pathways, as well as potential on-site and off-site receptors.

The identified site characterisation data gaps (**Section 4.7**) were largely addressed with the exceptions of:

- No soil samples have been collected and tested to characterise deep soil conditions within the setback areas (i.e. outside of the proposed basement footprint area). Targeted sampling from the setback areas, particularly north of the childcare centre, are considered necessary for proper characterisation of proposed deep soil areas.
- The existing environmental data set provides only a preliminary waste classification of the bulk excavated soils from the proposed basement excavation. Additional sampling and laboratory analysis will be required to satisfy NSW EPA minimum sampling densities for waste classification to inform appropriate offsite disposal of surplus soils, in compliance with the relevant regulatory guidelines.

It is considered that these data gaps can be adequately closed through implementation of the supplementary investigations outlined in the recommendations included within **Section 10**.

9. CONCLUSIONS

The site located at 9 Albert Street and 31 O'Connell Street, North Parramatta NSW was the subject of a Detailed Site Investigation to characterise soil and groundwater conditions and to assess the nature and degree of on-site contamination.

The key findings of this DSI were as follows:

- A review of site history indicated the site had been used for light commercial purposes as a medical facility (mental health hospital) from the 1950s. The site formerly contained commercial buildings in the northern portion from the 1950s onwards. Demolition and removal of structures occurred between 1986 and 2002. More recently the main building was used as a pre-school and was demolished in 2022.
- A search through the record of regulatory notices for contaminated land indicated that the site and neighbouring site were free of statutory notices issued by the NSW EPA. The site was not identified on the List of NSW contaminated sites notified to the EPA.
- Subsurface conditions were generalised as a pavement layer of asphalt (at some locations), followed by fill (to a maximum depth of 1.1m BGL), overlying natural, residual clays and bedrock at depth. Groundwater inflow was observed at depths between 6.5 m and 7.0 mBGL. Groundwater standing water level (SWL) was recorded at depths ranging from 0.92 m BGL to 3.21 m BGL.
- Laboratory assessment for relevant chemicals of concern indicated most soils were below the adopted soil investigation criteria, with the exception of localised areas impacted with lead, Carcinogenic PAHs, and TRH (F3), which will require appropriate remediation of setback soils to ensure that childcare centre users are not exposed to human health risks.
- Preliminary waste classification of proposed bulk excavated soils from the basement footprint area indicated that soils might be classified as General Solid Waste (non-putrescible). However, additional sampling and testing will be required to provide certainty for the elevated BaP concentrations (particularly in the vicinity of BH9), and meet minimum sampling density requirements for final waste classification, which may be undertaken during the bulk excavation stage.
- Groundwater concentrations for most chemicals of concern were reported below the adopted water criteria, with the exception zinc and copper, which showed low level exceedances, but were reflective of background (regional) groundwater quality, and within the adjusted criteria for naturally elevated parameters. Groundwater quality is therefore not deemed to be a cause for environmental concern.
- Review of the CSM indicated the model remains valid for the proposed development, with final remaining data gaps being the proper characterisation of setback soils to the north of the childcare centre and the final waste classification of excavated materials, which includes bulk excavated soils from the basement footprint area, and lead, Carcinogenic PAHs and TRH (F3) impacted fill soils located in setback areas to the west, south and east of the childcare centre.

Based on the findings of this DSI and with consideration of the Statement of Limitations (**Section 11**) it was concluded that the site is subject to impacted soils that warrant remedial action to protect childcare centre users from potential health risks.

The site can be made suitable for the proposed mixed-use development, in accordance with *State Environment Protection Policy* (*Resilience and Hazards*) 2021 under the NSW *Environmental Planning and Assessment Act 1997* subject to the recommendations outlined in **Section 10** being implemented during development.

10. RECOMMENDATIONS

EI provide the following recommendations in relation to the proposed development of the site:

- Prior to site demolition, a suitably qualified and experienced consultant should be engaged to perform a Hazardous Materials Survey on existing site structures to identify potentially hazardous building products (such as asbestos and PCBs), that must be managed appropriately to prevent potential release to the environment during demolition works.
- Preparation and implementation of a Data Gap Investigation which includes:
  - Procedures for the characterisation and validation of the setback deep soil areas outside the basement footprint north of the childcare centre;
  - Procedures for the characterisation and validation of basement soils, with particular attention to Benzo(a)pyrene sampling and TCLP testing in the north east corner of the site, requesting the lab data to be set at a lower limit of reporting.
- Preparation and implementation of a Remedial Action Plan (RAP). The RAP should be prepared in accordance with the NSW EPA 2020 *Contaminated Land Guidelines for Consultants reporting on contaminated land* and should include:
  - Procedures for the remediation of impacted fill soils, with due regard for the findings of the Data Gap Investigation;
  - The appropriate management of excavated soils to be disposed from the site, including the bulk excavated materials from the basement footprint area and the excavated impacted material from the setback soils in the vicinity of the childcare centre;
  - Details of the waste management process including waste classification of the soils leaving the site, waste loading and transport to appropriately licensed waste facilities, waste tracking and the maintenance of waste documentation for auditing purposes;
  - The validation of backfill material used to reinstate remediated areas, to confirm suitability for the proposed land uses;
  - A sampling and analysis quality plan (SAQP) for the validation assessment; and
  - A contingency management and unexpected finds protocol to ensure any unforeseen contamination is managed in accordance with NSW legislation and relevant EPA guidelines.
  - An unexpected finds protocol for implementation during site excavation to ensure any unforeseen contamination is managed in accordance with the NSW legislation and relevant EPA guidelines
- Any material being imported to the site (e.g. for landscaping purposes) should be assessed for potential contamination in accordance with the NSW EPA guidelines as being suitable for the intended land use, or be classified as VENM.
- Preparation of a final Site Validation Report by a suitably qualified environmental consultant, documenting the remedial works and certifying the suitability of site soils for the proposed land uses.

11. STATEMENT OF LIMITATIONS

The findings presented in this report are the result of discrete and specific sampling methodologies used in accordance with best industry practices and standards. Due to the site-specific nature of soil sampling from point locations, it is considered likely that all variations in subsurface conditions across a site cannot be fully defined, no matter how comprehensive the field investigation program.

While normal assessments of data reliability have been made, EI assumes no responsibility or liability for errors in any data obtained from previous assessments conducted on site, regulatory agencies (e.g. Council, NSW EPA), statements from sources outside of EI, or developments resulting from situations outside the scope of works of this project.

Despite all reasonable care and diligence, the ground conditions encountered and concentrations of contaminants measured may not be representative of conditions between the locations sampled and investigated. In addition, site characteristics may change at any time in response to variations in natural conditions, chemical reactions and other events, e.g. groundwater movement and or spillages of contaminating substances. These changes may occur subsequent to EI's investigations and assessment.

EI's assessment is necessarily based upon the result of the site investigation and the restricted program of surface and subsurface sampling, screening and chemical testing which was set out in the proposal. Neither EI, nor any other reputable consultant, can provide unqualified warranties nor does EI assume any liability for site conditions not observed or accessible during the time of the investigations.

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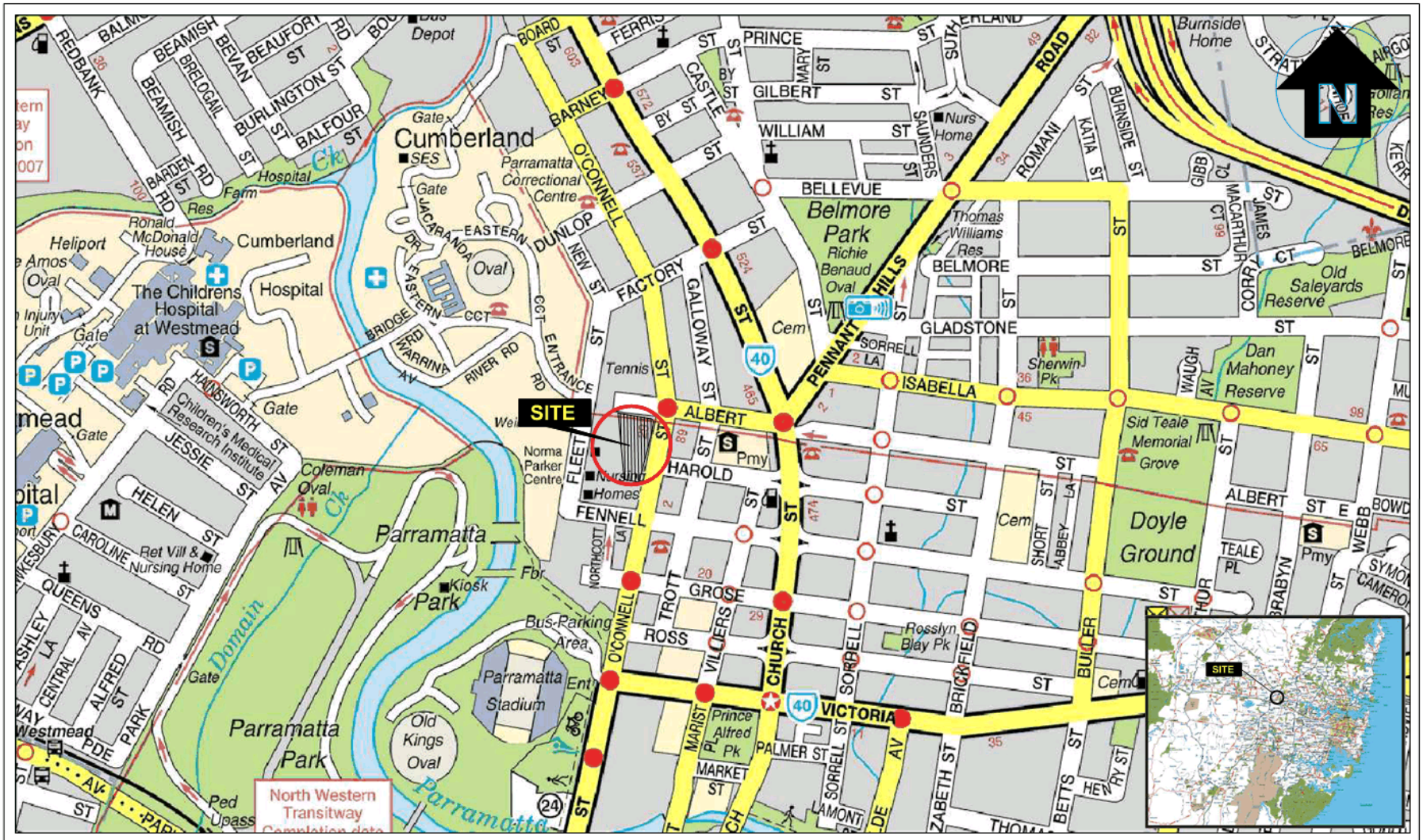
ABBREVIATIONS

ACM	Asbestos-Containing Materials
AHD	Australian Height Datum
AS	Australian Standard
ASS	Acid Sulfate Soils
ANZG	Australian and New Zealand and Australian State and Territory Governments
B(a)P	Benzo(a)Pyrene (a polycyclic aromatic hydrocarbon compound)
BGL	Below Ground Level
BH	Borehole
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CLM	Contaminated Land Management
CSM	Conceptual Site Model
COC	Chain of Custody
DA	Development Application
DBYD	Dial Before You Dig
DP	Deposited Plan
DSI	Detailed Site Investigation
DQI	Data Quality Indicators
DQO	Data Quality Objectives
EPA	Environment Protection Authority (of New South Wales)
ESL	Ecological Screening Level
F1	C_6-C_{10} TRH less sum of BTEX concentrations
F2	>C_{10}-C_{16} TRH less naphthalene
F3	>C_{16}-C_{34} TRH
F4	>C_{34}-C_{40} TRH
GPR	Ground Penetrating Radar
HIL	Health-based Investigation Level
HSL	Health-based Screening Level
km	Kilometres
LGA	Local Government Area
LOR	Limit of Reporting (of corresponding laboratory analytical method)
m	Metres
mg/kg	Milligrams per Kilogram
mg/L	Milligrams per Litre
µg/L	Micrograms per Litre
NEPC	National Environmental Protection Council
NEPM	National Environmental Protection Measure
NSW	New South Wales
OCP	Organochlorine Pesticides
OEH	Office of Environment and Heritage, NSW
OPP	Organophosphorus Pesticides
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PFAS	Per- or Poly- Fluoroalkyl Substances
PID	Photo-Ionisation Detector
pH	Potential (a measure of the acidity or basicity of an aqueous solution)
PQL	Practical Quantitation Limit (limit of detection for a given laboratory method)
QA/QC	Quality Assurance / Quality Control
RAP	Remediation Action Plan
SEPP	State Environmental Planning Policy
SIL	Soil Investigation Level
SRA	Sample Receipt Advice (document confirming laboratory receipt of samples)

SWL	Standing Water Level
TCLP	Toxicity Characteristics Leaching Procedure
TEQ	Toxicity Equivalent Quotient
TPH	Total Petroleum Hydrocarbons (superseded term equivalent to TRH)
TRH	Total Recoverable Hydrocarbons (non-specific analysis of organic compounds)
US EPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VOC	Volatile Organic Compounds (specific organic compounds which are volatile)

Appendix A – Figures



eiaustralia Practical Solutions for Built Environments Suite 6.01, 55 Miller Street, PYRMONT 2009 Ph (02) 9516 0722 Fax (02) 9518 5088	Drawn:	L.C.	**Peterose Pty Ltd** Detailed Site Investigation 9 Albert Street and 31 O'Connell Street, North Parramatta, NSW Site Locality Plan
	Approved:	-	
	Date:	01-12-22	
	Scale:	Not To Scale	

Figure: 1

Project: E25473.E02_Rev1

ALBERT STREET
O'CONNELL STREET
BH18M
BH19
BH20M
BH16
BH17
BH9
BH14
BH15
BH8
BH13
BH12
BH7
BH11
BH10
BH6
BH5
BH4
BH3
BH2M
BH1
N
0 10 50 100
Approx. Scale (m)
Map Sources: https://apps.nearmap.com/, Imagery Dated on: 09/11/2022, and DKO Architecture: Basement Plan dated 14/11/2023, Lower Ground Floor dated 30/11/2023, and Upper Ground Floor dated 14/11/2023
LEGEND (All locations are approximate as per proposed development plans, see Appendix 3)
Site boundary
Basement area footprint
Borehole location
Borehole/monitoring well location
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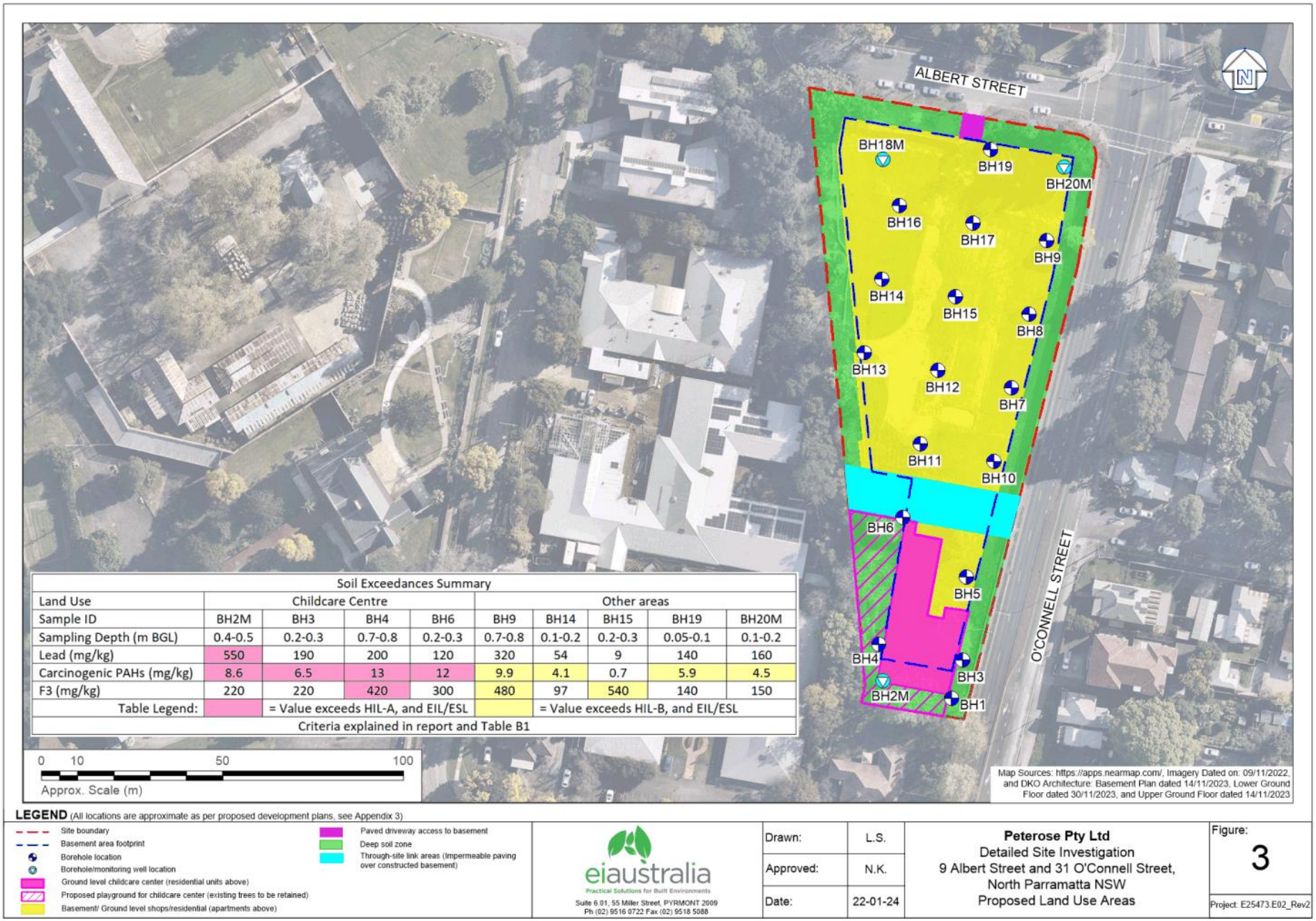
Drawn: L.S.
Approved: ---
Date: 22-01-24
Peterose Pty Ltd
Detailed Site Investigation
9 Albert Street and 31 O'Connell Street,
North Parramatta NSW
Borehole Location Plan
Figure: 2
Project: E25473.E02_Rev2



Soil Exceedances Summary									
Land Use	Childcare Centre				Other areas				
Sample ID	BH2M	BH3	BH4	BH6	BH9	BH14	BH15	BH19	BH20M
Sampling Depth (m BGL)	0.4-0.5	0.2-0.3	0.7-0.8	0.2-0.3	0.7-0.8	0.1-0.2	0.2-0.3	0.05-0.1	0.1-0.2
Lead (mg/kg)	550	190	200	120	320	54	9	140	160
Carcinogenic PAHs (mg/kg)	8.6	6.5	13	12	9.9	4.1	0.7	5.9	4.5
F3 (mg/kg)	220	220	420	300	480	97	540	140	150
Table Legend:		= Value exceeds HIL-A, and EIL/ESL				= Value exceeds HIL-B, and EIL/ESL			
Criteria explained in report and Table B1									

LEGEND (All locations are approximate as per proposed development plans, see Appendix 3)

- Site boundary
- Basement area footprint
- Borehole location
- Borehole/monitoring well location
- Ground level childcare center (residential units above)
- Proposed playground for childcare center (existing trees to be retained)
- Basement/ Ground level shops/residential (apartments above)
- Paved driveway access to basement
- Deep soil zone
- Through-site link areas (Impermeable paving over constructed basement)

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Approved:	N.K.
Date:	22-01-24

Peterose Pty Ltd
Detailed Site Investigation
9 Albert Street and 31 O'Connell Street,
North Parramatta NSW
Proposed Land Use Areas

Figure: 3

Project: E25473.E02_Rev2

Appendix B – Tables

Table 01 - Summary of Soil Analytical Results

E25473.E02 - North Parramatta

Sample ID	Relevant Land Use Criteria	Sample Location (with respect to proposed developed)	Sampled Material	Heavy Metals										PAHs					BTEX				TRH				TPH				Asbestos
				As	Cd	Total Cr	TCLP Cr (mg/L)	Cu	Pb	TCLP Pb (mg/L)	Hg	Ni	TCLP Ni (mg/L)	Zn	Carcinogenic PAHs as BAP (TEQ)	Total PAHs	Benzo(a)pyrene	TCLP Benzo(a)pyrene (mg/L)	Naphthalene	Benzene	Toluene	Ethylbenzene	Total Xylenes	F1	F2	F3	F4	>C10-C16	>C16-C34	Total OCPs	Total OPPs	Total PCBs	Presence / Absence
CHILD CARE AREA																															
BH1_0.1-0.2	HIL A / HSL-A&B	Child Care Area	Fill - Silty CLAY	3	<0.5	13	NT	2.6	16	NT	0.16	2	NT	29	1.4	14	0.9	NT	<0.1	<0.1	<0.1	<0.2	<0.3	<25	<25	<50	<100	<25	<50	<1	<0.2	<1	<0.1
BH1_1.5-1.6	HIL A / HSL-A&B	Child Care Area	Sandy CLAY	<1	<0.5	3	NT	0.6	4	NT	<0.05	<1	NT	<1	<0.5	<0.4	<0.1	NT	<0.1	<0.1	<0.1	<0.2	<0.3	<25	<25	<50	<100	<25	<50	NT	NT	NT	NT
BH2M_0.4-0.5	HIL A / HSL-A&B	Child Care Area	Fill - Silty CLAY	14	0.4	14	NT	41	680	0.3	0.18	5.7	NT	240	6.8	79	5.7	<0.1	0.6	<0.1	<0.1	<0.1	<0.2	<0.3	<25	<25	220	<100	<25	220	<1	<0.2	<1	<0.1
BH3_0.2-0.3	HIL A / HSL-A&B	Child Care Area	Fill - Silty CLAY	4	<0.5	12	NT	22	190	NT	0.34	8.4	NT	100	6.8	99	4.3	NT	0.3	<0.1	<0.1	<0.2	<0.3	<25	<25	220	<100	<25	230	<1	<0.2	<1	<0.1
BH4_0.7-0.8	HIL A / HSL-A&B	Child Care Area	Fill - Silty CLAY	5	<0.5	16	NT	35	230	0.06	0.16	8.1	NT	160	15	120	8.5	NT	0.5	<0.1	<0.1	<0.1	<0.2	<0.3	<25	<25	420	<100	<25	440	<1	<0.2	<1	<0.1
BH4_1.3-1.4	HIL A / HSL-A&B	Child Care Area	Sandy CLAY	8	<0.5	16	NT	<0.5	10	NT	<0.05	0.8	NT	19	<0.5	<0.4	<0.1	NT	<0.1	<0.1	<0.1	<0.2	<0.3	<25	<25	<50	<100	<25	<50	NT	NT	NT	NT
BH6_0.2-0.3	HIL A / HSL-A&B	Child Care Area	Fill - Silty CLAY	4	<0.5	11	NT	12	120	NT	0.5	4.3	NT	89	12	110	8.1	<0.1	0.4	<0.1	<0.1	<0.1	<0.2	<0.3	<25	<25	360	<100	<25	370	<1	<0.2	<1	<0.1
Maximum				14	0.4	16	0	41	550	0.3	0.18	8.4	0	360	15	120	8.5	0	0.5	0	0	0	0	0	0	420	0	0	440	0	0	0	0
95% UCL				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Building/Basement Footprint																																
BH5_0.4-0.5	HIL B / HSL-A&B	Basement Footprint	Fill - Clayey GRAVEL	2	<0.5	7	NT	30	88	NT	<0.05	6.8	NT	89	2	55	1.9	NT	<0.1	<0.1	<0.1	<0.2	<0.3	<25	<25	<50	<100	<25	<50	<1	<0.2	<1	<0.1
BH5_0.9-1.0	HIL B / HSL-A&B	Basement Footprint	Fill - Clayey GRAVEL	5	<0.5	15	NT	16	88	NT	<0.05	4	NT	110	1.5	13	1	NT	<0.1	<0.1	<0.1	<0.2	<0.3	<25	<25	140	<100	<25	150	<1	<0.2	<1	<0.1
BH5_1.4-1.5	HIL B / HSL-A&B	Basement Footprint	Sandy CLAY	5	<0.5	12	NT	<0.5	10	NT	<0.05	<0.5	NT	6.2	<0.5	<0.4	<0.1	NT	<0.1	<0.1	<0.1	<0.2	<0.3	<25	<25	<50	<100	<25	<50	NT	NT	NT	NT
BH7_0.5-0.6	HIL B / HSL-A&B	Basement Footprint	Sandy CLAY	4	<0.5	22	NT	<0.5	14	NT	<0.05	<0.5	NT	4.7	<0.5	<0.4	<0.1	NT	<0.1	<0.1	<0.1	<0.2	<0.3	<25	<25	<50	<100	<25	<50	<1	<0.2	NT	<0.1
BH8_0.1-0.2	HIL B / HSL-A&B	Basement Footprint	Fill - Silty CLAY	4	<0.5	13	NT	27	150	0.06	0.23	2.6	NT	170	1.8	16	1.2	NT	<0.1	<0.1	<0.1	<0.2	<0.3	<25	<25	<50	<100	<25	<50	<1	<0.2	<1	<0.1
BH8_0.7-0.8	HIL B / HSL-A&B	Basement Footprint	Fill - Silty CLAY	3	<0.5	11	NT	39		0.21	0.47	7.5	NT	220	6.9	84	6.8	0.3	0.3	<0.1	<0.1	<0.1	<0.2	<0.3	<25	<25	400	<100	<25	400				
BH9_1.4-1.5	HIL B / HSL-A&B	Basement Footprint	Sandy CLAY	6	<0.5	11	NT	<0.5	12	NT	<0.05	<0.5	NT	2.5	<0.5	<0.4	<0.1	NT	<0.1	<0.1	<0.1	<0.2	<0.3	<25	<25	<50	<100	<25	<50	NT	NT	NT	NT
BH10_0.05-0.1	HIL B / HSL-A&B	Basement Footprint	Fill - Sandy GRAVEL	2	<0.5	100	<1.00	83	9	NT	<0.05	81	0.029	83	<0.5	<0.4	<0.1	NT	<0.1	<0.1	<0.1	<0.2	<0.3	<25	<25	<50	<100	<25	<50	<1	<0.2	<1	<0.1
BH11_0.05-0.1	HIL B / HSL-A&B	Basement Footprint	Fill - Clayey GRAVEL	3	<0.5	21	NT	38	11	NT	<0.05	80	NT	49	<0.5	<0.4	<0.1	NT	<0.1	<0.1	<0.1	<0.2	<0.3	<25	<25	<50	<100	<25	<50	<1	<0.2	<1	<0.1
BH12_0.1-0.2	HIL B / HSL-A&B	Basement Footprint	Fill - Silty CLAY	2	<0.5	7.6	NT	6.6	17	NT	<0.05	2.9	NT	11	<0.5	<0.4	<0.1	NT	<0.1	<0.1	<0.1	<0.2	<0.3	<25	<25	<50	<100	<25	<50	<1	<0.2	<1	<0.1
BH13_0.2-0.3	HIL B / HSL-A&B	Basement Footprint	Fill - Silty CLAY	3	<0.5	16	NT	30	67	NT	0.08	6.8	NT	92	2.4	20	1.8	NT	<0.1	<0.1	<0.1	<0.2	<0.3	<25	<25	<50	<100	<25	<50	<1	<0.2	<1	<0.1
BH13_0.6-0.7	HIL B / HSL-A&B	Basement Footprint	Sandy CLAY	4	<0.5	15	NT	<0.5	7	NT	<0.05	<0.5	NT	<1	<0.5	<0.4	<0.1	NT	<0.1	<0.1	<0.1	<0.2	<0.3	<25	<25	<50	<100	<25	<50	NT	NT	NT	NT
BH14_0.1-0.2	HIL B / HSL-A&B	Basement Footprint	Fill - Silty CLAY	3	<0.5	11	NT	11	54	NT	0.11	6.2	NT	55	4.1	34	2.7	NT	<0.1	<0.1	<0.1	<0.2	<0.3	<25	<25	97	<100	<25	97	<1	<0.2	<1	<0.1
BH15_0.2-0.3	HIL B / HSL-A&B	Basement Footprint	Fill - Sandy GRAVEL	2	<0.5	13	NT	25	9	NT	<0.05	26	NT	33	0.7	5.1	0.5	NT	<0.1	<0.1	<0.1	<0.2	<0.3	<25	<25	840	290	<25	1,100	<1	<0.2	<1	<0.1
BH15_0.7-0.8	HIL B / HSL-A&B	Basement Footprint	Sandy CLAY	2	<0.5	7.5	NT	<0.5	6	NT	<0.05	0.5	NT	<1	<0.5	<0.4	<0.1	NT	<0.1	<0.1	<0.1	<0.2	<0.3	<25	<25	<50	<100	<25	<50	NT	NT	NT	NT
BH16_0.1-0.2	HIL B / HSL-A&B	Basement Footprint	Fill - Silty CLAY	4	0.3	15	NT	16	71	NT	0.09	6.3	NT	68	3.5	27	2.3	NT	<0.1	<0.1	<0.1	<0.2	<0.3	<25	<25	97	<100	<25	97	<1	<0.2	<1	<0.1
BH17_0.2-0.3	HIL B / HSL-A&B	Basement Footprint	Fill - Silty CLAY	5	<0.5	17	NT	18	68	NT	<0.05	12	NT	23	1.9	11	1	NT	<0.1	<0.1	<0.1	<0.2	<0.3	<25	<25	110	<100	<25	110	<1	<0.2	<1	<0.1
BH17_0.7-0.8	HIL B / HSL-A&B	Basement Footprint	Sandy CLAY	6	<0.5	15	NT	<0.5	14	NT	<0.05	<0.5	NT	9.6	<0.5	<0.4	<0.1	NT	<0.1	<0.1	<0.1	<0.2	<0.3	<25	<25	<50	<100	<25	<50	NT	NT	NT	NT
BH18M_0.1-0.2	HIL B / HSL-A&B	Basement Footprint	Fill - Silty CLAY	3	<0.5	16	NT	34	30	NT	0.08	5.9	NT	29	5.2	23	2.1	NT	<0.1	<0.1	<0.1	<0.2	<0.3	<25	<25	<50	<100	<25	<50	<1	<0.2	<1	<0.1
BH18M_1.1-1.2	HIL B / HSL-A&B	Basement Footprint	SANDSTONE	4	<0.5	9	NT	1	10	NT	<0.05	0.7	NT	6	<0.5	1.3	0.1	NT	<0.1	<0.1	<0.1	<0.2	<0.3	<25	<25	<50	<100	<25	<50	NT	NT	NT	NT
BH19_0.05-0.1	HIL B / HSL-A&B	Basement Footprint	Fill - Silty CLAY	3	<0.5	13	NT	18	140	NT	0.12	6.9	NT	130	6.9	43	4	NT	<0.1	<0.1	<0.1	<0.2	<0.3	<25	<25	140	<100	<25	150	<1	<0.2	<1	<0.1
BH20M_0.1-0.2	HIL B / HSL-A&B	Basement Footprint	Fill - Silty CLAY	4	<0.5	21	NT	17	190	NT	<0.05	6.7	NT	88	4.8	35	3	NT	0.1	<0.1	<0.1	<0.2	<0.3	<25	33	160	<100	<25	160	<1	<0.2	<1	<0.1
BH20M_1.0-1.1	HIL B / HSL-A&B	Basement Footprint	SANDSTONE	7	<0.5	10	NT	<0.5	5	NT	<0.05	<0.5	NT	<1	<0.5	<0.4	<0.1	NT	<0.1	<0.1	<0.1	<0.2	<0.3	<25	<25	<50	<100	<25	<50	NT	NT	NT	NT
Maximum				7	0.3	100	0	30	160	0.21	0.47	81	0.029	220	3.9	84	6.8	0.3	0.3	0	0	0	0	0	0	33	540	290	0	650	0	0	0	0
95% UCL				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
SILs																																
NEPC[1]	HIL A - Residential with access to soils			100	20	100		6,000	300		40	400		7,400	3	300														240		1	
	HIL B - Residential with minimal soil access			500	150	500 Cr(VI)		30,000	1,200		120	1,200		60,000	4	400														600		1	
NEPC[2]	HSL A & B (HSL A) Childcare centre use (HSL B) High density with ground level residential occupation	Source depths (0 m to <1 m BGL)																	0	0.6	110	NL	95	40	250								
		Source depths (1 m to <2 m BGL)																	NL	0.7	NL	NL	210	65	NL								
		Source depths (2 m to <4 m BGL)																	NL	1	NL	NL	NA	100	NL								
		Source depths (4 m + BGL)																	NL	2	NL	NL	NA	150	NL								
NEPC[3]	EIL / ESL - Residential[5]			100		430	160	1,260		170		300				33		170	50	85	70	105	180	120	300	2,800			180			
	EIL / ESL - Commercial / Industrial[5]			160		680	220	1,800		260		540				33		170	75	135	165	180	215	170	1700	3,300			640			
NEPC[4]	Asbestos contamination HSL A - Residential Bonded Asbestos (%)																															0.01
	Asbestos contamination HSL A - Residential Asbestos Fines and Friable Asbestos (%)																															0.001
NEPC[4]	Management Limits – Residential, parkland and public open space for coarse grained soil texture																						700	1,000	3,500	10,000						

Notes: All results are recorded in mg/kg (unless otherwise stated)

Highlighted values indicates concentration exceeds Human Health Based Soil Criteria
Highlighted values indicates concentration exceeds Ecological criteria
Highlighted values indicates criteria exceeded

NT Not Tested i.e. the sample was not analysed.
ND Not detected i.e. all concentrations of the compounds within the analyte group were found to be below the laboratory limits of detection.
NC Not calculated i.e. for contaminants that were not detected at elevated concentrations.
NL Not Limiting' - The tested contaminant cannot exceed the maximum allowable vapour risk due to its specific chemical solubility limit - Ref. NEPC 2013, Schedule B1, Table 1A(3).
NR No current published criterion.
NA Not applicable.
SILs Soil Investigation Levels - NEPC (2013) National Environmental Protection (Assessment of Site Contamination) Measure 1999 - 2013 Amendment, Schedule B1, for the indicated exposure settings:

NEPC[1] HIL - Health based investigation levels for (HIL-A) Residential sites with garden / accessible soil, includes children's day care centres, preschools and primary schools; (HIL-B) residential with minimal opportunities for soil access; (HIL-C) public open space such as parks, playgrounds, playing fields, secondary schools and footpaths; and (HIL-D) commercial and industrial settings.

NEPC[2] HSL - Health based screening levels for vapour intrusion for (HSL - A&B) Low to high density Residential sites; (HSL-C) recreational open spaces; and (HSL-D) Commercial/Industrial Sites.

NEPC[3] EIL - Ecological investigation levels and ESL- Ecological screening levels. These are generic and site-specific values derived for the site using ASC NEPM Schedule B1, Tables 1B(1), 1B(2), 1B(3), 1B(4), 1B(5) and 1B(6).

EIL criteria is derived from a site specific Added Contaminant Limit (ACL) with the Ambient Background Concentration (ABC) for an old NSW and high traffic suburb. In lack of physiochemical properties for soils across the site, a site specific ACL criteria for heavy metals based on averaged physiochemical properties (pH=5.5, CEC=10 cmol/kg, organic carbon content=2 (%OC)) provided through NSW Department of Planning, Industry and Environment (DPIE) eSPADE v2.0 website

NEPC[4] Management Limits for TPH fractions in soil - Coarse Grained soil values were applied, being the most conservative of the material types.

5 Benzo(a)pyrene criteria based on CRC Care Technical Report No. 10, 'Risk-based management guidance for benzo(a)pyrene' (2017).

TRH Fractions Total Recoverable Hydrocarbon Fractions:
F1 To obtain F1 subtract the sum of BTEX concentrations from the C6-C10 fraction.
F2 To obtain F2 subtract Naphthalene from the >C10-C16 fraction.
F3 (>C16-C34)
F4 (>C34-C40)

Table B2 – Summary of Groundwater Investigation Results

E25473.E02 - North Parramatta

Sample Identification	Date		As	Cd	Cr	Cu	Pb	Hg	Ni	Zn	Total PAHs	Benzo(a)pyrene	Naphthalene	Benzene	Toluene	Ethylbenzene	o-xylene	m+p-xylene	F1	F2	F3	F4	Chloroform	Total VOCs	Total Phenols	pH
			PAHs											BTEX					TRHs				VOCs		Others	
Detailed Site Investigation (EI 2022)																										
CHILD CARE AREA																										
GW-BH2M-1	29/03/2022		1	<0.1	<1	<1	<1	<0.01	1	24	<1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<1	<50	84	<500	<500	<0.5	<10	<0.05	6.7
BUILDING/BASEMENT FOOTPRINT																										
GW-BH18M-1	29/03/2022		<1	<0.1	<1	2	<1	<0.01	1	22	<1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<1	<50	<50	<500	<500	0.6	<10	<0.05	5
GW-BH20M-1			<1	<0.1	<1	3	<1	<0.01	6	57	<1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<1	<50	<50	<500	<500	<0.5	<10	<0.05	5.4
Statistical Analysis																										
Maximum Concentration			0	<0.1	<1	3	<1	<0.01	6	57	<1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<1	<50	0	<500	<500	0.6	<10	<0.05	5.4
GILs																										
NEPC [1] (2013)	HSL A & B - Low to High Density Residential	2 m to < 4m	NA										NL	5,000	NL	NL	NL	NL	NL	NL	NA					
		4 m to <8 m											NL	5,000	NL	NL	NL	NL	NL	NL						
		8 m +											NL	5,000	NL	NL	NL	NL	NL	NL						
	HSL C - Recreational Open Space	2 m to < 4m											NL	NL	NL	NL	NL	NL	NL	NL						
		4 m to <8 m											NL	NL	NL	NL	NL	NL	NL	NL						
		8 m +											NL	NL	NL	NL	NL	NL	NL	NL						
	HSL D - Commercial Industrial	2 m to < 4m											NL	30,000	NL	NL	NL	NL	NL	NL						
		4 m to <8 m											NL	30,000	NL	NL	NL	NL	NL	NL						
		8 m +											NL	35,000	NL	NL	NL	NL	NL	NL						
ANZG [2] (2018)	Fresh Water		94 (AsIII) 42 (AsV)	0.06	3.3 (CrIII) 6 (CrVI)	1.8	5.6	0.06	13	15	NR		37	1,300	230	110	470	100	NR				1100	NR	320	
	Marine Water		NR	0.7	49 (CrIII) 20 (CrVI)	3	6.6	0.1	200	23			90	900	230	110	470 [4]	100 [4]							400	
NHMRC [3] (2017)	Recreational Water		100	20	50	1000 (A)	100	10	200	3000	NR	0.01	NR	10	25 (A)	3 (A)	20 (A)	20 (A)								

Notes:

All concentration values are in units of µg/L

GILs Groundwater Investigation Levels, groundwater quality criteria, as shown.

Concentration exceeds Ecological criteria.

Coloured cell indicates which criteria are exceeded.

NR No current published criteria.

NA Not applicable.

1 NEPC criteria applied are the Groundwater Health Screening Levels for vapour intrusion, Ref. ASC NEPM 2013, Schedule B1, Table 1A(4).

2 ANZG criteria applied are the low-moderate reliability default guideline values for fresh and marine water quality at the 90% protection level for highly disturbed aquatic ecosystems. A 99% level of species protection was used for the bioaccumulative metals Cadmium and Me

3 NHMRC Recreational Water criteria are the lower value between NHMRC (2017) Australian Drinking Water Guideline x 10 and the Aesthetic based drinking quality guideline. An (A) is shown where the Aesthetic value is applied.

4 The available ANZG (2018) Marine Water default guideline values for xylenes are for an unknown level of species protection, Ref. ANZG (2018).

TRH Fractions:

F1 To obtain F1 subtract the sum of BTEX concentrations from the C6-C10 fraction.

F2 To obtain F2 subtract Naphthalene from the >C10-C16 fraction.

F3 (>C16-C34)

F4 (>C34-C40)

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Table B3 - Preliminary Waste Classification E25473.E02 - North Parramatta

Sample ID	Relevant Land Use Criteria	Sampling Material	Heavy Metals											PAH				BTEX				TPH		Pesticides		Total PCBs	Asbestos
			As	Cd	Total Cr	TCLP Cr (mg/L)	Cu	Pb	TCLP Pb (mg/L)	Hg	Ni	TCLP Ni (mg/L)	Zn	Total PAHs	Benzo(a)pyrene	TCLP_Benzo(a)pyrene	Naphthalene	Benzene	Toluene	Ethylbenzene	Total Xylenes	C6 - C9	C10 - C36	Total OCPs	Total OPPs		Presence/Absence
Basement Footprint - Bulk Excavated Soils																											
BH5_0.4-0.5	HIL B / HSL-A&B	FIll - Clayey GRAVEL	2	<0.3	7	NT	30	55	NT	<0.05	6.6	NT	83	15	1.3	NT	<0.1	<0.1	<0.1	<0.1	<0.3	<20	<110	<1	<1.7	<1	ND
BH5_0.9-1.0	HIL B / HSL-A&B	FIll - Clayey GRAVEL	5	<0.3	15	NT	14	88	NT	<0.05	4	NT	110	13	1	NT	<0.1	<0.1	<0.1	<0.1	<0.3	<20	150	<1	<1.7	<1	ND
BH5_1.4-1.5	HIL B / HSL-A&B	Sandy CLAY	5	<0.3	12	NT	<0.5	10	NT	<0.05	<0.5	NT	8.2	<0.8	<0.1	NT	<0.1	<0.1	<0.1	<0.1	<0.3	<20	<110	NT	NT	NT	NT
BH7_0.5-0.6	HIL-B / HSL-A&B	Sandy CLAY	4	<0.3	22	NT	<0.5	14	NT	<0.05	<0.5	NT	4.7	<0.8	<0.1	NT	<0.1	<0.1	<0.1	<0.1	<0.3	<20	<110	<1	<1.7	NT	ND
BH8_0.1-0.2	HIL-B / HSL-A&B	FIll - Silty CLAY	4	<0.3	13	NT	27	160	0.06	0.23	2.6	NT	170	16	1.2	NT	<0.1	<0.1	<0.1	<0.1	<0.3	<20	<110	<1	<1.7	<1	ND
BH8_0.7-0.8	HIL-B / HSL-A&B	FIll - Silty CLAY	3	<0.3	11	NT	39	320	0.21	0.47	7.5	NT	220	84	6.8	0.3	0.3	<0.1	<0.1	<0.1	<0.3	<20	490	<1	<1.7	<1	ND
BH9_1.4-1.5	HIL-B / HSL-A&B	Sandy CLAY	6	<0.3	11	NT	<0.5	12	NT	<0.05	<0.5	NT	2.5	<0.8	<0.1	NT	<0.1	<0.1	<0.1	<0.1	<0.3	<20	<110	NT	NT	NT	NT
BH10_0.05-0.1	HIL-B / HSL-A&B	FIll - Sandy GRAVEL	2	<0.3	100 **	<0.005	33	9	NT	<0.05	81	0.029	63	<0.8	<0.1	NT	<0.1	<0.1	<0.1	<0.1	<0.3	<20	<110	<1	<1.7	<1	ND
BH11_0.05-0.1	HIL-B / HSL-A&B	FIll - Clayey GRAVEL	3	<0.3	21	NT	38	11	NT	<0.05	80	NT	40	<0.8	<0.1	NT	<0.1	<0.1	<0.1	<0.1	<0.3	<20	<110	<1	<1.7	<1	ND
BH12_0.1-0.2	HIL-B / HSL-A&B	FIll - Silty CLAY	2	<0.3	7.8	NT	6.8	17	NT	<0.05	2.9	NT	11	<0.8	<0.1	NT	<0.1	<0.1	<0.1	<0.1	<0.3	<20	<110	<1	<1.7	<1	ND
BH13_0.2-0.3	HIL-B / HSL-A&B	FIll - Silty CLAY	3	<0.3	16	NT	16	67	NT	0.06	8.8	NT	92	20	1.8	NT	<0.1	<0.1	<0.1	<0.1	<0.3	<20	<110	<1	<1.7	<1	ND
BH13_0.6-0.7	HIL-B / HSL-A&B	Sandy CLAY	4	<0.3	15	NT	<0.5	7	NT	<0.05	<0.5	NT	<2	<0.8	<0.1	NT	<0.1	<0.1	<0.1	<0.1	<0.3	<20	<110	NT	NT	NT	NT
BH14_0.1-0.2	HIL-B / HSL-A&B	FIll - Silty CLAY	3	<0.3	11	NT	11	54	NT	0.11	6.2	NT	55	34	2.7	NT	<0.1	<0.1	<0.1	<0.1	<0.3	<20	<110	<1	<1.7	<1	ND
BH15_0.2-0.3	HIL-B / HSL-A&B	FIll - Sandy GRAVEL	2	<0.3	13	NT	25	9	NT	<0.05	26	NT	30	5.1	0.5	NT	<0.1	<0.1	<0.1	<0.1	<0.3	<20	630	<1	<1.7	<1	ND
BH15_0.7-0.8	HIL-B / HSL-A&B	Sandy CLAY	2	<0.3	7.5	NT	<0.5	6	NT	<0.05	0.5	NT	<2	<0.8	<0.1	NT	<0.1	<0.1	<0.1	<0.1	<0.3	<20	<110	NT	NT	NT	NT
BH16_0.1-0.2	HIL-B / HSL-A&B	FIll - Silty CLAY	4	0.3	15	NT	16	71	NT	0.09	6.3	NT	68	27	2.3	NT	<0.1	<0.1	<0.1	<0.1	<0.3	<20	<110	<1	<1.7	<1	ND
BH17_0.2-0.3	HIL-B / HSL-A&B	FIll - Silty CLAY	5	<0.3	17	NT	18	96	NT	<0.05	12	NT	23	11	1	NT	<0.1	<0.1	<0.1	<0.1	<0.3	<20	<110	<1	<1.7	<1	ND
BH17_0.7-0.8	HIL-B / HSL-A&B	Sandy CLAY	6	<0.3	15	NT	<0.5	14	NT	<0.05	<0.5	NT	5.6	<0.8	<0.1	NT	<0.1	<0.1	<0.1	<0.1	<0.3	<20	<110	NT	NT	NT	NT
BH18M_0.1-0.2	HIL-B / HSL-A&B	FIll - Silty CLAY	3	<0.3	16	NT	3.4	30	NT	0.08	1.9	NT	20	23	2.1	NT	<0.1	<0.1	<0.1	<0.1	<0.3	<20	<110	<1	<1.7	<1	ND
BH18M_1.1-1.2	HIL-B / HSL-A&B	SANDSTONE	4	<0.3	9	NT	1	10	NT	<0.05	0.7	NT	5	1.3	0.1	NT	<0.1	<0.1	<0.1	<0.1	<0.3	<20	<110	NT	NT	NT	NT
BH19_0.05-0.1	HIL-B / HSL-A&B	FIll - Silty CLAY	3	<0.3	13	NT	18	140	NT	0.12	8.9	NT	130	43	4	NT	<0.1	<0.1	<0.1	<0.1	<0.3	<20	150	<1	<1.7	<1	ND
BH20M_0.1-0.2	HIL-B / HSL-A&B	FIll - Silty CLAY	4	<0.3	21	NT	17	180	NT	<0.05	5.7	NT	86	35	3	NT	0.1	<0.1	<0.1	<0.1	<0.3	<20	180	<1	<1.7	<1	ND
BH20M_1.0-1.1	HIL-B / HSL-A&B	SANDSTONE	7	<0.3	10	NT	<0.5	5	NT	<0.05	<0.5	NT	<2	<0.8	<0.1	NT	<0.1	<0.1	<0.1	<0.1	<0.3	<20	<110	NT	NT	NT	NT
Statistical data																											
Maximum Concentration			7	0.3	22	0	39	320	0.21	0.47	81	0.029	220	84	6.8	0.3	0.3	0	0	0	0	0	630	<1	<1.7	<1	No
Childcare Centre Setback Areas - Remediation Spoil																											
BH1_0.1-0.2	HIL A / HSL-A&B	FIll - Silty CLAY	3	<0.3	13	NT	2.8	18	NT	0.06	2	NT	29	14	0.9	NT	<0.1	<0.1	<0.1	<0.1	<0.3	<20	<110	<1	<1.7	<1	ND
BH1_1.5-1.6	HIL A / HSL-A&B	Sandy CLAY	<1	<0.3	3	NT	0.6	4	NT	<0.05	<0.5	NT	<2	<0.8	<0.1	NT	<0.1	<0.1	<0.1	<0.1	<0.3	<20	<110	NT	NT	NT	NT
BH2M_0.4-0.5	HIL A / HSL-A&B	FIll - Silty CLAY	14 *	0.4	14	NT	41	660	0.3	0.68	5.7	NT	240	79	5.7	<0.1	0.4	<0.1	<0.1	<0.1	<0.3	<20	220	<1	<1.7	<1	ND
BH3_0.2-0.3	HIL A / HSL-A&B	FIll - Silty CLAY	4	<0.3	12	NT	22	190	NT	0.34	8.4	NT	160	59	4.3	NT	0.3	<0.1	<0.1	<0.1	<0.3	<20	230	<1	<1.7	<1	ND
BH4_0.7-0.8	HIL A / HSL-A&B	FIll - Silty CLAY	5	<0.3	16	NT	36	200	0.06	0.56	6.1	NT	360	120	8.6	<0.1	0.6	<0.1	<0.1	<0.1	<0.3	<20	440	<1	<1.7	<1	ND
BH4_1.3-1.4	HIL A / HSL-A&B	Sandy CLAY	8	<0.3	16	NT	<0.5	10	NT	<0.05	0.8	NT	19	<0.8	<0.1	NT	<0.1	<0.1	<0.1	<0.1	<0.3	<20	<110	NT	NT	NT	NT
BH5_0.2-0.3	HIL A / HSL-A&B	FIll - Silty CLAY	4	<0.3	11	NT	12	120	NT	0.5	4.3	NT	89	110	8.1	<0.1	0.4	<0.1	<0.1	<0.1	<0.3	<20	310	<1	<1.7	<1	ND
Statistical data																											
Maximum Concentration			8	0.4	16	0	41	550	0.3	0.68	8.4	0	360	120	8.6	0	0.5	0	0	0	0	0	440	0	0	0	0
NSW EPA (2014) Criteria																											
Waste Classification Assessment Criteria	NSW EPA 2014 General Solid Waste	CT1 (mg/kg) [1]	100	20	100			100		4	40			200	0.8			10	288	600	1,000	650	10,000	50	250	<50	If detected material is Special Waste - Asbestos Waste
		TCLP1 (mg/L) [2]	5	1	5	5		5	5	0.2	2	2		NR	0.04	0.04		0.5	14.4	30	50	NR	NR	NR	NR	NR	
		SCC1 (mg/kg) [3]	500	100	1,900	1,900		1,500	1,500	50	1,050	1,050		200	10	10		18	518	1,080	1,800	650	10,000	50	250	50	
	NSW EPA 2014 Restricted Solid Waste	CT2 (mg/kg) [3]	400	80	400			400		16	160			800	3.2			40	1,152	2,400	4,000	2,600	40,000	50	1000	50	
		TCLP2 (mg/L) [4]	20	4	20	20		20	20	0.8	8	8		NR	0.16	0.16		2	57.6	120	200	NR	NR	NR	NR	NR	
		SCC2 (mg/kg) [4]	2,000	400	7,600	7,600		6,000	6,000	200	4,200	4,200		800	23	23		72	2,073	4,320	7,200	2,600	40,000	50	1000	50	

Notes:

Results are recorded in concentration units of mg/kg, unless otherwise indicated	
Bold values	Indicated exceedance of CT1 or CT2 waste category threshold concentrations, but not necessarily the TCLP1/SCC1 or TCLP2/SCC2 thresholds
	Dark grey cell indicates no reference criteria are available
NT	Not analysed
*	TCLP testing for arsenic is required to confirm *General Solid Waste (Non-putrescible)* classification
**	The waste assessment criteria are for the hexavalent form of chromium (i.e. Cr VI). As 100 mg/kg total chromium was reported, the Cr VI concentration is likely to be below the CT1 threshold of 100 mg/kg, i.e. within the *General Solid Waste* classification.
TPH	Total Petroleum Hydrocarbons

Waste Classification Assessment Criteria:

1. CT1 *General Solid Waste* thresholds (without leachate test), in NSW EPA 2014 Waste Classification Guidelines, Table 1
2. TCLP1/SCC1 *General Solid Waste* thresholds (leachable concentration and total concentration when used together), in NSW EPA 2014 Waste Classification Guidelines Table 2
3. CT2 *Restricted Solid Waste* thresholds (without leachate test), in NSW EPA 2014 Waste Classification Guidelines, Table 1
4. TCLP2/SCC2 Maximum values for Leachable concentration and specific contaminant concentration for *Restricted Solid Waste* classification, in NSW EPA 2014 Waste Classification Guidelines Table 2

Table B4 **Soil RPD Values** **E25473.E02 - North Parramatta**

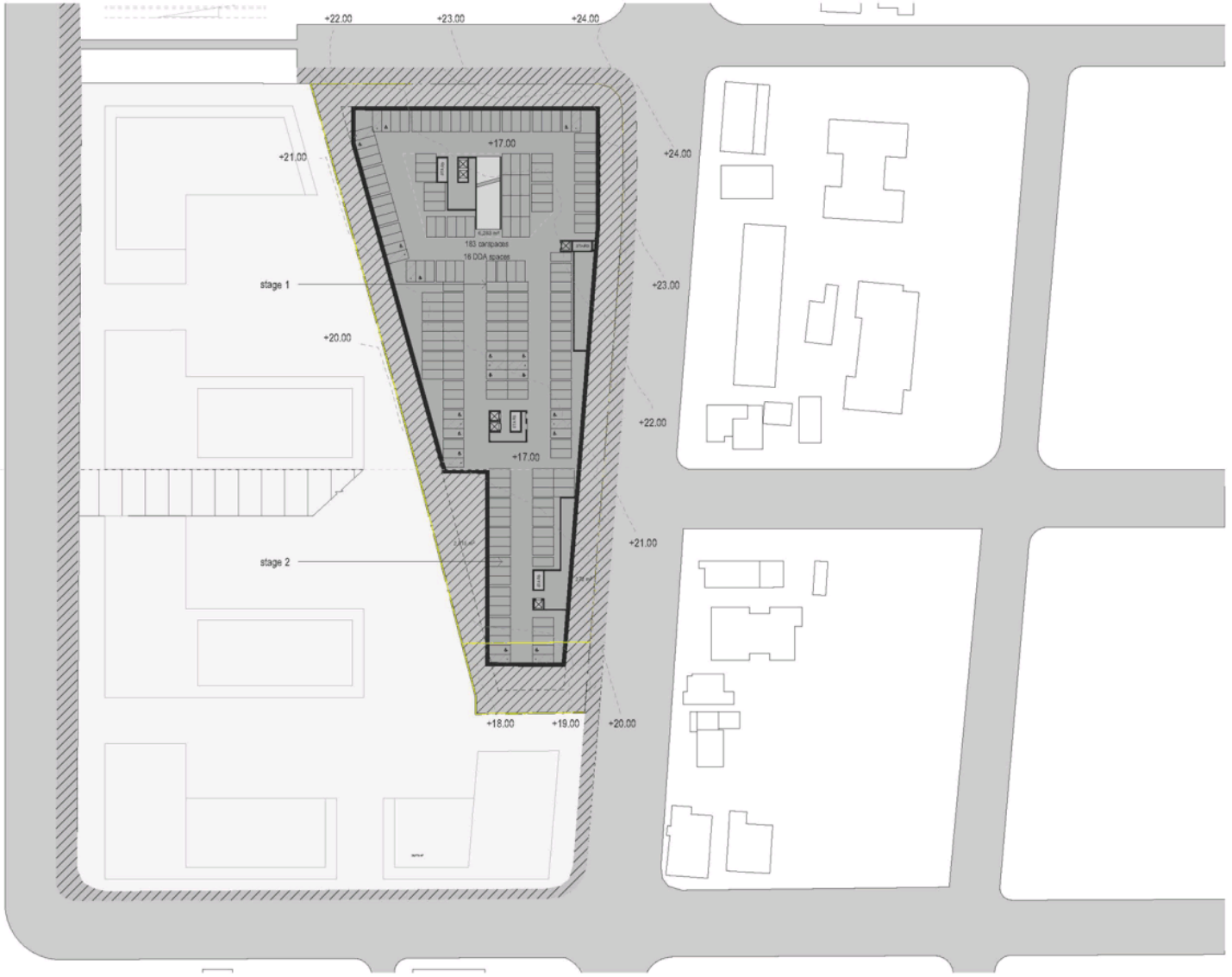
Sample identification	Description	Date	TRH				BTEX				Heavy Metals							
			F1	F2	F3	F4	Benzene	Toluene	Ethylbenzene	Xylene (total)	Arsenic	Cadmium	Chromium (Total)	Copper	Lead	Mercury	Nickel	Zinc
Intra-laboratory Duplicate - Soil Investigation																		
BH8_0.1-0.2	Soil	22/03/2022	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	4	<0.3	13	27	150	0.23	2.6	170
QD1	BFD of BH8_0.1-0.2		<25	<25	110	<120	<0.1	<0.1	<0.1	<0.3	3	<0.3	17	20	110	0.21	2.1	120
	RPD		*0.00*	*0.00*	*20.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*28.57*	*0.00*	*26.67*	*29.79*	*30.77*	*9.09*	*21.28*	*34.48*
Inter-laboratory Duplicate - Soil Investigation																		
BH8_0.1-0.2	Soil	22/03/2022	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	4	<0.3	13	27	150	0.23	2.6	170
QT1	BFD of BH8_0.1-0.2		<25	<50	<100	<1100	<0.1	<0.1	<0.1	<0.3	7	<0.4	36	33	65	0.2	2	49
	RPD		*0.00*	*NA*	*NA*	*NA*	*0.00*	*0.00*	*0.00*	*0.00*	**54.55**	*NA*	**93.88**	*20.00*	**79.07**	*13.95*	*26.09*	**110.50**
Rinsate Blanks																		
QR1	Equipment Rinsate	22/03/2022	< 0.02	< 0.05	< 0.1	< 0.1	< 0.001	< 0.001	< 0.001	< 0.003	< 0.001	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.005
Trip Blanks																		
QTB	Soil Trip Blank	Laboratory Prepared	-	-	-	-	<0.1	<0.1	<0.1	<0.3	-	-	-	-	-	-	-	-
Trip Spikes																		
QTS	Soil Trip Spike	Laboratory Prepared	-	-	-	-	[95%]	[100%]	[99%]	[97%]	-	-	-	-	-	-	-	-

NOTE: All results are reported in mg/kg (soil) or µg/L (water)

66.67	RPD calculated by halving detection limit exceeds 30-50% range referenced from AS4482.1 (2005)
52.87	RPD exceeds 30-50% range referenced from AS4482.1 (2005)

F1 = TRH C6-C10 less the sum of BTEX
F2 = TRH >C10-C16 less naphthalene
F3 = TRH >C16-C34
F4 = TRH >C34-C40

Appendix C – Proposed Development Plans



BASEMENT PLAN

DKO ARCHITECTURE

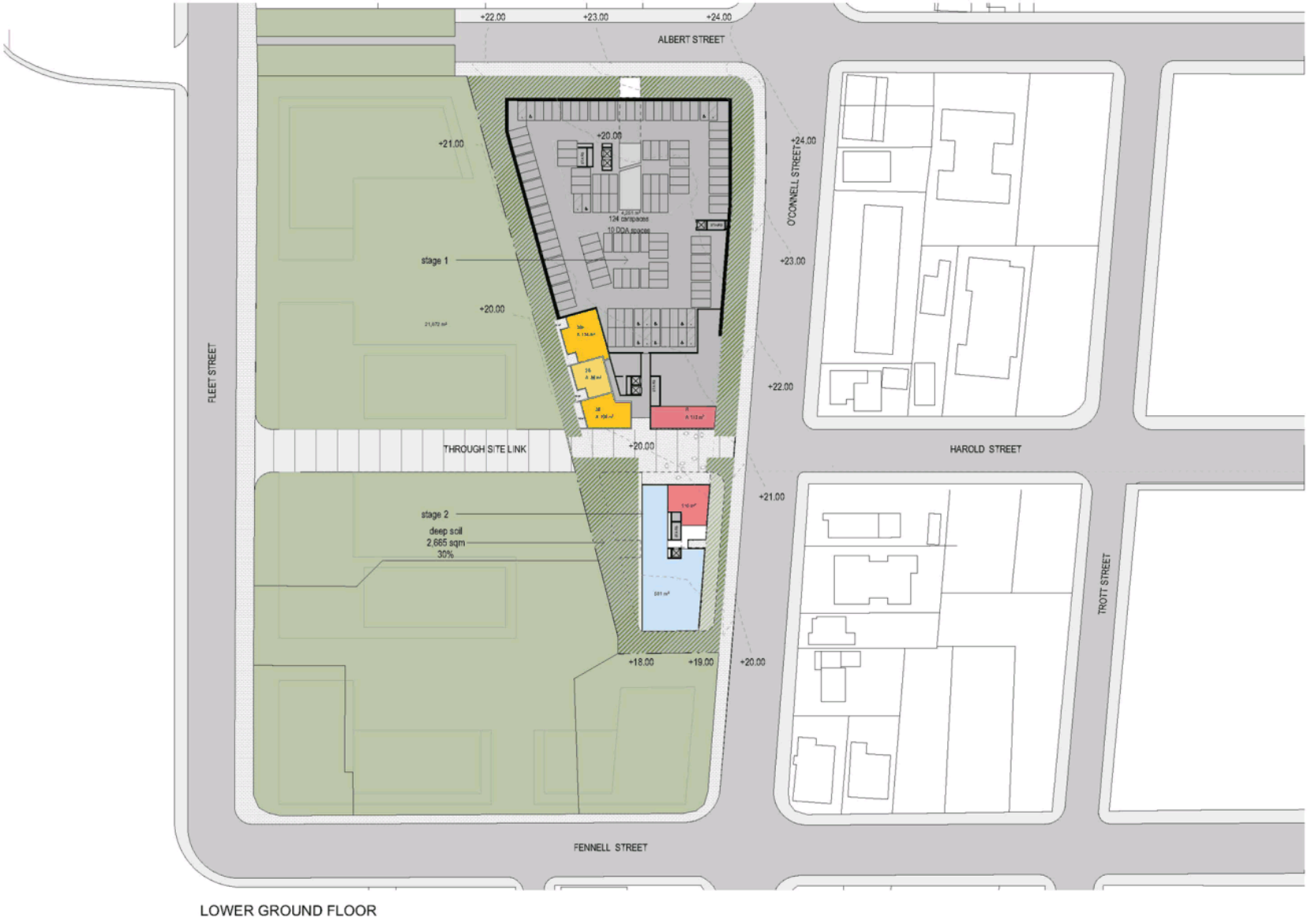
9 Albert Street & 31 O'Connell Street,
North Parramatta
DOCUMENT TITLE

PREPARED FOR:
CEEROSE

PROJECT
#13387

11/14/2023

DD.MM.YYYY
PAGE 1



LOWER GROUND FLOOR

DKO ARCHITECTURE

9 Albert Street & 31 O'Connell Street, North Parramatta
DOCUMENT TITLE

PREPARED FOR: CEEROSE

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11/30/2023

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PAGE 2

UPPER GROUND FLOOR

DKO ARCHITECTURE

9 Albert Street & 31 O'Connell Street, North Parramatta
DOCUMENT TITLE

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11/14/2023

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PAGE 3

Appendix D – Site Photographs

Photograph 1: View of property 9 Albert Street, North Strathfield NSW ('the site'), facing north east (22-March-21).

Photograph 2: View of the site, facing south east (22-March-22).

Photograph 3: View of the site, facing north (22-March 2022).

Photograph 4: View of the shed/office located in the north-western portion of the site (22-March 2022).

Photograph 5: View of the mature trees present along the western portion of the site.

Photograph 6: View of the mature trees present along the southern portion of the site.

Appendix E – Borehole Logs and Field Data Sheets

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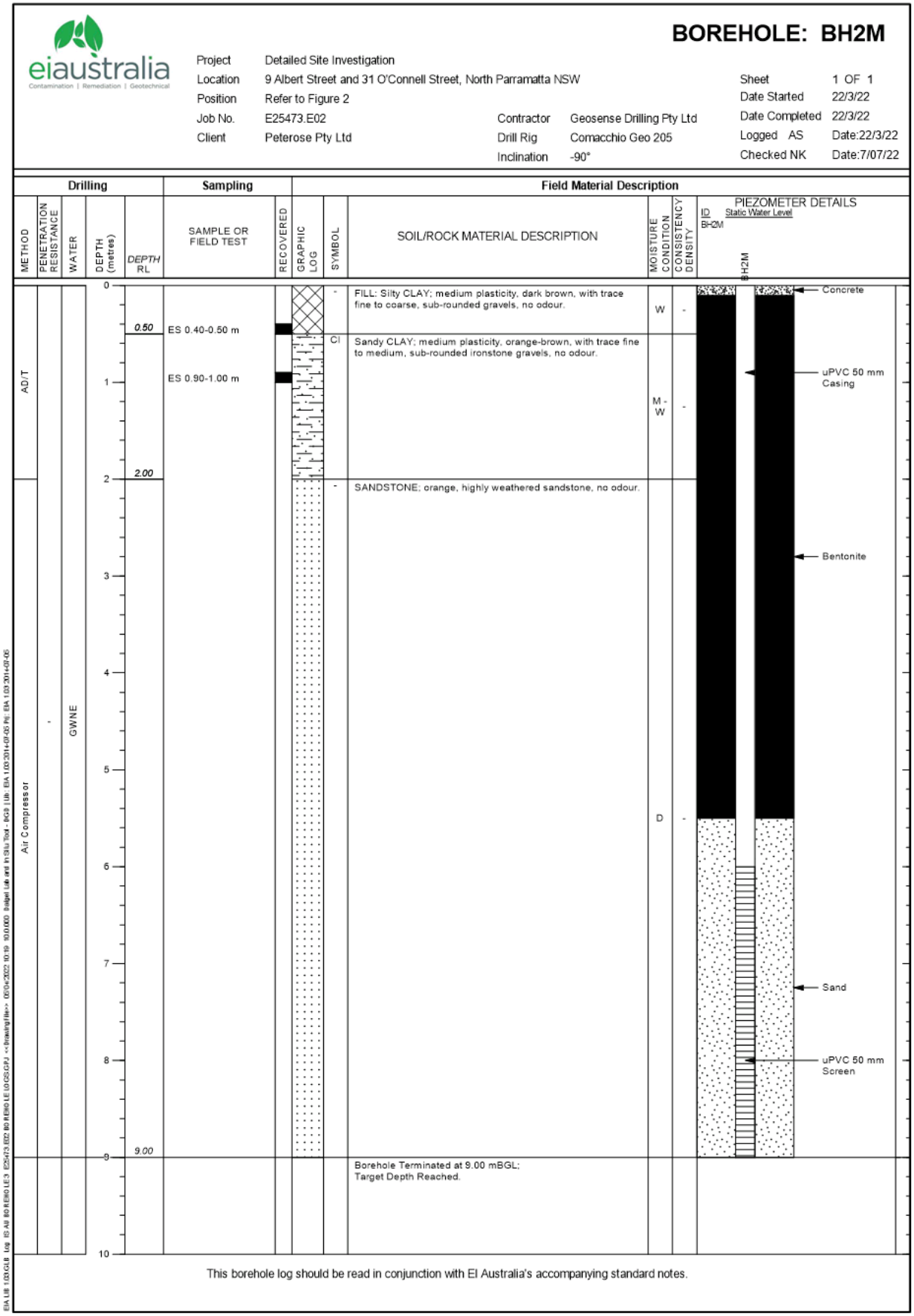
BOREHOLE: BH1

Project	Detailed Site Investigation	Sheet	1 OF 1
Location	9 Albert Street and 31 O'Connell Street, North Parramatta NSW	Date Started	22/3/22
Position	Refer to Figure 2	Date Completed	22/3/22
Job No.	E25473.E02	Contractor	Hartgeo Pty Ltd
Client	Peterose Pty Ltd	Drill Rig	Auger Drill
Inclination	-90°	Logged AS	Date:22/3/22
		Checked NK	Date:7/07/22

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0	0.50	ES 0.10-0.20 m			-	FILL: Silty CLAY; medium plasticity, light brown, with trace fine to coarse, sub-rounded gravels, no odour.	W	-	FILL
			1	1.40	ES 0.90-1.00 m			CI	Sandy CLAY; medium plasticity, light grey mottled orange, with trace fine to medium, sub-rounded ironstone gravels, no odour.	M	-	NATURAL
				1.60	ES 1.50-1.60 m				From 1.6 m, grey, no odour.	D - M		
			2 – 10						Borehole Terminated at 1.60 mBGL; Target Depth Reached.			

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

EIA LIB 1.03.GLB Log IS AU BOREHOLE 3 E25473.E02 BOREHOLE LOGS.GPJ <<DrawingFile>> 05/04/2022 10:19 10.0.000 Datgel Lab and In Situ Tool - DGD | Lib: EIA 1.03 2014-07-05 Prj: EIA 1.03 2014-07-05


BOREHOLE: BH2M
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Project Detailed Site Investigation
Location 9 Albert Street and 31 O'Connell Street, North Parramatta NSW
Position Refer to Figure 2
Job No. E25473.E02
Client Peterose Pty Ltd
Contractor Geosense Drilling Pty Ltd
Drill Rig Comacchio Geo 205
Inclination -90°
Sheet 1 OF 1
Date Started 22/3/22
Date Completed 22/3/22
Logged AS Date:22/3/22
Checked NK Date:7/07/22
Drilling
Sampling
Field Material Description
METHOD
PENETRATION RESISTANCE
WATER
DEPTH (metres)
DEPTH RL
SAMPLE OR FIELD TEST
RECOVERED
GRAPHIC LOG
SYMBOL
SOIL/ROCK MATERIAL DESCRIPTION
MOISTURE CONDITION
CONSISTENCY DENSITY
PIEZOMETER DETAILS
ID Static Water Level
BH2M
AD/T
Air Compressor
GWNE
0.50
2.00
9.00
ES 0.40-0.50 m
ES 0.90-1.00 m
FILL: Silty CLAY; medium plasticity, dark brown, with trace fine to coarse, sub-rounded gravels, no odour.
Sandy CLAY; medium plasticity, orange-brown, with trace fine to medium, sub-rounded ironstone gravels, no odour.
SANDSTONE; orange, highly weathered sandstone, no odour.
Borehole Terminated at 9.00 mBGL;
Target Depth Reached.
W
M - W
D
Concrete
uPVC 50 mm Casing
Bentonite
Sand
uPVC 50 mm Screen
This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

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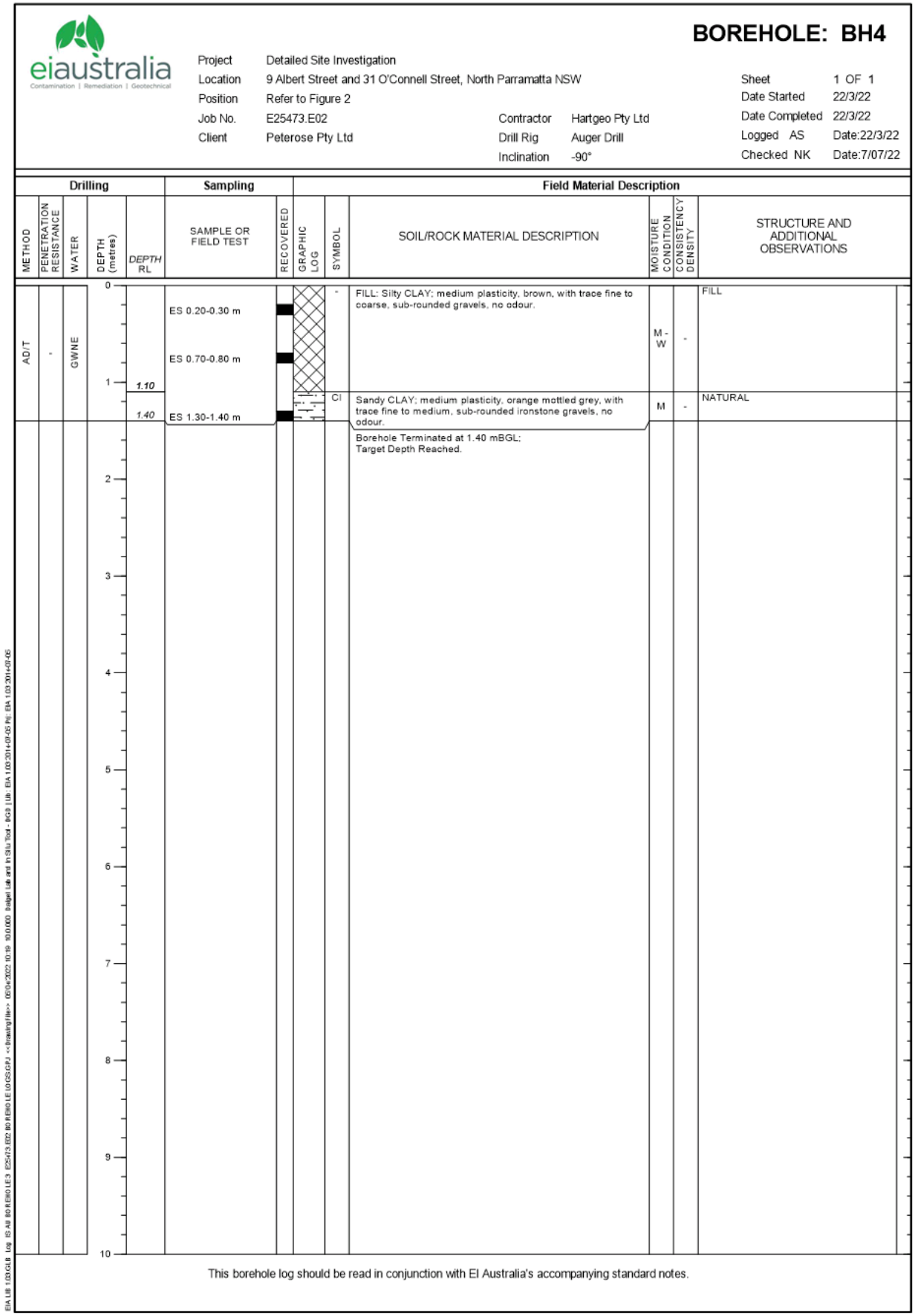
BOREHOLE: BH3

Project	Detailed Site Investigation			Sheet	1 OF 1
Location	9 Albert Street and 31 O'Connell Street, North Parramatta NSW			Date Started	22/3/22
Position	Refer to Figure 2			Date Completed	22/3/22
Job No.	E25473.E02	Contractor	Hartgeo Pty Ltd	Logged AS	Date:22/3/22
Client	Peterose Pty Ltd	Drill Rig	Auger Drill	Checked NK	Date:7/07/22
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0	0.50	ES 0.20-0.30 m			-	FILL: Silty CLAY; medium plasticity, brown, with trace fine to coarse, sub-rounded gravels, no odour.	W	-	FILL
			1	1.00	ES 1.00-1.10 m			CI	Sandy CLAY; medium plasticity, orange-brown, with trace fine to medium, sub-rounded ironstone gravels, no odour. From 1.0 m, light grey, no odour.	M	-	NATURAL
				1.50					Borehole Terminated at 1.50 mBGL; Target Depth Reached.			

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

EIA LIB 1.03.GLB Log IS AU BOREHOLE 3 E25473.E02 BOREHOLE LOGS.GPJ <<DrawingFile>> 05/04/2022 10:19 10.0.000 Datgel Lab and In Situ Tool - DGD | Lib: EIA 1.03.2014-07-05 Prj: EIA 1.03.2014-07-05



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BOREHOLE: BH4

Project	Detailed Site Investigation			Sheet	1 OF 1
Location	9 Albert Street and 31 O'Connell Street, North Parramatta NSW			Date Started	22/3/22
Position	Refer to Figure 2			Date Completed	22/3/22
Job No.	E25473.E02	Contractor	Hartgeo Pty Ltd	Logged AS	Date:22/3/22
Client	Peterose Pty Ltd	Drill Rig	Auger Drill	Checked NK	Date:7/07/22
		Inclination	-90°		

Drilling					Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0		ES 0.20-0.30 m			-	FILL: Silty CLAY; medium plasticity, brown, with trace fine to coarse, sub-rounded gravels, no odour.	M - W	-	FILL
			1	1.10	ES 0.70-0.80 m							
				1.40	ES 1.30-1.40 m			CI	Sandy CLAY; medium plasticity, orange mottled grey, with trace fine to medium, sub-rounded ironstone gravels, no odour.	M	-	NATURAL
									Borehole Terminated at 1.40 mBGL; Target Depth Reached.			
			2									
			3									
			4									
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

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BOREHOLE: BH5

Project	Detailed Site Investigation			Sheet	1 OF 1
Location	9 Albert Street and 31 O'Connell Street, North Parramatta NSW			Date Started	22/3/22
Position	Refer to Figure 2			Date Completed	22/3/22
Job No.	E25473.E02	Contractor	Hartgeo Pty Ltd	Logged AS	Date:22/3/22
Client	Peterose Pty Ltd	Drill Rig	Auger Drill	Checked NK	Date:7/07/22
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0		ES 0.40-0.50 m			-	FILL: Clayey GRAVEL; fine to coarse, sub-rounded to sub-angular gravels, medium plasticity, with rootlets, no odour.	M - W	-	FILL
			1	1.00	ES 0.90-1.00 m			CI	Sandy CLAY; medium plasticity, grey mottled orange, with trace fine to medium, sub-rounded ironstone gravels, no odour.	M	-	NATURAL
				1.50	ES 1.40-1.50 m				Borehole Terminated at 1.50 mBGL; Target Depth Reached.			
			2									
			3									
			4									
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

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BOREHOLE: BH6

Project	Detailed Site Investigation			Sheet	1 OF 1
Location	9 Albert Street and 31 O'Connell Street, North Parramatta NSW			Date Started	22/3/22
Position	Refer to Figure 2			Date Completed	22/3/22
Job No.	E25473.E02	Contractor	Hartgeo Pty Ltd	Logged AS	Date:22/3/22
Client	Peterose Pty Ltd	Drill Rig	Auger Drill	Checked NK	Date:7/07/22
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0		ES 0.20-0.30 m			-	FILL: Silty CLAY; medium plasticity, light brown, with trace fine to coarse, sub-rounded gravels, no odour.	M - W	-	FILL
				0.60				CI	Sandy CLAY; medium plasticity, orange mottled grey, with trace fine to medium, sub-rounded ironstone gravels, no odour.	M	-	NATURAL
			1	1.10	ES 1.00-1.10 m							
									Borehole Terminated at 1.10 mBGL; Target Depth Reached.			
			2									
			3									
			4									
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

EIA LIB 1.03.GLB Log IS AU BOREHOLE 3 E25473.E02 BOREHOLE LOGS.GPJ <<DrawingFile>> 05/04/2022 10:19 10.0.000 Datgel Lab and In Situ Tool - DGD | Lib: EIA 1.03.2014-07-05 Prj: EIA 1.03.2014-07-05

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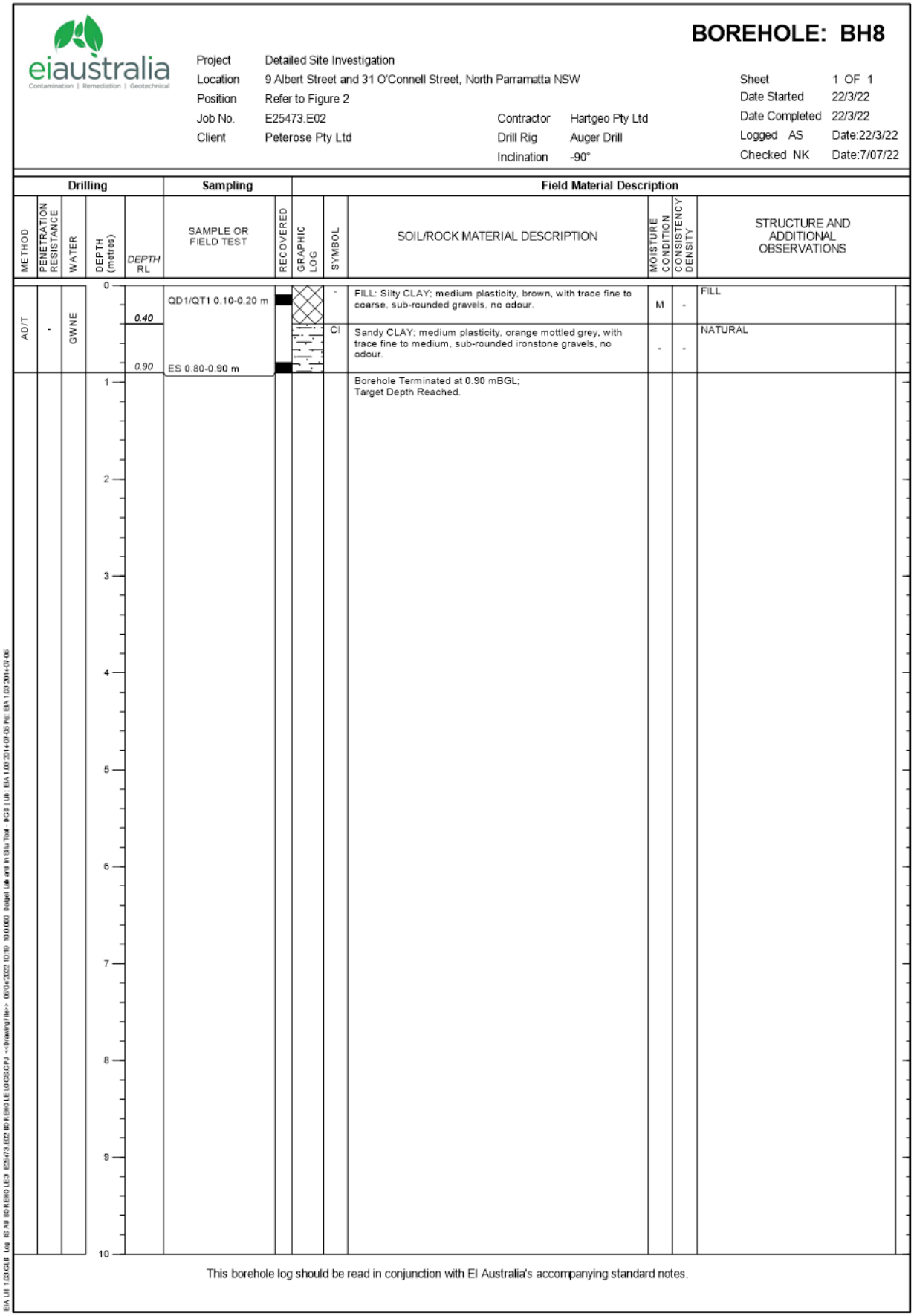
BOREHOLE: BH7

Project	Detailed Site Investigation			Sheet	1 OF 1
Location	9 Albert Street and 31 O'Connell Street, North Parramatta NSW			Date Started	22/3/22
Position	Refer to Figure 2			Date Completed	22/3/22
Job No.	E25473.E02	Contractor	Hartgeo Pty Ltd	Logged AS	Date:22/3/22
Client	Peterose Pty Ltd	Drill Rig	Auger Drill	Checked NK	Date:7/07/22
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0	0.60	ES 0.50-0.60 m			CI	Sandy CLAY; medium plasticity, grey mottled orange, with trace fine to medium, sub-rounded ironstone gravels, no odour.	M	-	NATURAL
									Borehole Terminated at 0.60 mBGL; Target Depth Reached.			

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.



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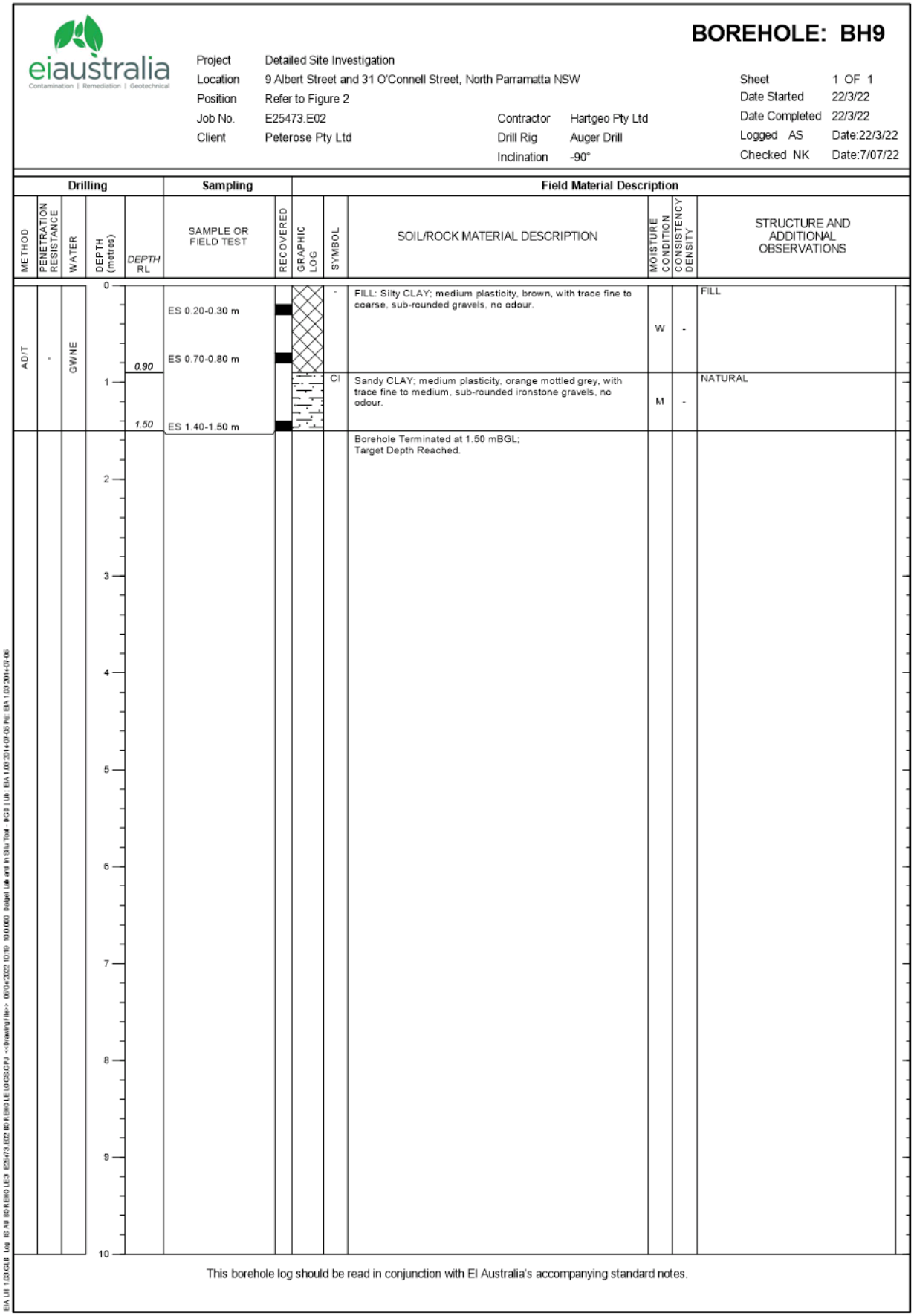
BOREHOLE: BH8

Project	Detailed Site Investigation			Sheet	1 OF 1
Location	9 Albert Street and 31 O'Connell Street, North Parramatta NSW			Date Started	22/3/22
Position	Refer to Figure 2			Date Completed	22/3/22
Job No.	E25473.E02	Contractor	Hartgeo Pty Ltd	Logged AS	Date:22/3/22
Client	Peterose Pty Ltd	Drill Rig	Auger Drill	Checked NK	Date:7/07/22
		Inclination	-90°		

Drilling					Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0		QD1/QT1 0.10-0.20 m			-	FILL: Silty CLAY; medium plasticity, brown, with trace fine to coarse, sub-rounded gravels, no odour.	M	-	FILL
				0.40				CI	Sandy CLAY; medium plasticity, orange mottled grey, with trace fine to medium, sub-rounded ironstone gravels, no odour.	-	-	NATURAL
				0.90	ES 0.80-0.90 m				Borehole Terminated at 0.90 mBGL; Target Depth Reached.			
			1									
			2									
			3									
			4									
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.



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BOREHOLE: BH9

Project	Detailed Site Investigation			Sheet	1 OF 1
Location	9 Albert Street and 31 O'Connell Street, North Parramatta NSW			Date Started	22/3/22
Position	Refer to Figure 2			Date Completed	22/3/22
Job No.	E25473.E02	Contractor	Hartgeo Pty Ltd	Logged AS	Date:22/3/22
Client	Peterose Pty Ltd	Drill Rig	Auger Drill	Checked NK	Date:7/07/22
		Inclination	-90°		

Drilling					Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0		ES 0.20-0.30 m			-	FILL: Silty CLAY; medium plasticity, brown, with trace fine to coarse, sub-rounded gravels, no odour.	W	-	FILL
					ES 0.70-0.80 m							
				0.90								
			1					CI	Sandy CLAY; medium plasticity, orange mottled grey, with trace fine to medium, sub-rounded ironstone gravels, no odour.	M	-	NATURAL
				1.50	ES 1.40-1.50 m							
									Borehole Terminated at 1.50 mBGL; Target Depth Reached.			
			2									
			3									
			4									
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

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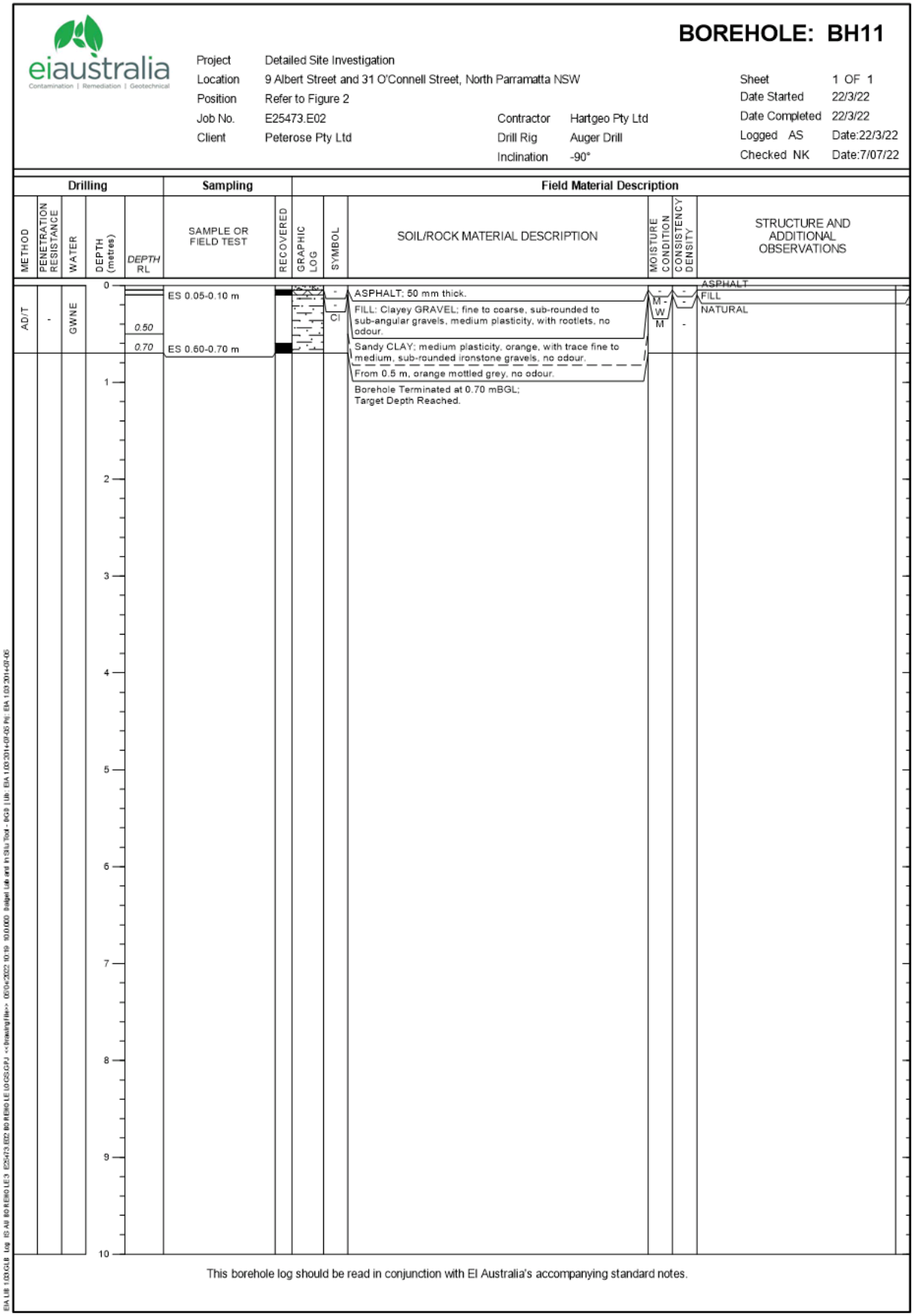
BOREHOLE: BH10

Project	Detailed Site Investigation			Sheet	1 OF 1
Location	9 Albert Street and 31 O'Connell Street, North Parramatta NSW			Date Started	22/3/22
Position	Refer to Figure 2			Date Completed	22/3/22
Job No.	E25473.E02	Contractor	Hartgeo Pty Ltd	Logged AS	Date:22/3/22
Client	Peterose Pty Ltd	Drill Rig	Auger Drill	Checked NK	Date:7/07/22
		Inclination	-90°		

Drilling					Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0	0.10	ES 0.05-0.10 m			-	FILL: Sandy GRAVEL; fine to coarse, sub-angular gravels, dark grey, fine to medium grained sand, no odour.	D	-	FILL
								CI	Sandy CLAY; medium plasticity, grey mottled orange, with trace fine to medium, sub-rounded ironstone gravels, no odour.	M	-	NATURAL
				0.60	ES 0.50-0.60 m				Borehole Terminated at 0.60 mBGL; Target Depth Reached.			
			1									
			2									
			3									
			4									
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

EIA LIB 1.03.GLB Log ES AU 80 RE80 LE 3 E25473.E02 80 RE80 LE LOGS.GPJ <<Drawing File>> 05/04/2022 10:19 10.0.000 Batgal Lab and In Situ Test - DCB | Lib: EIA 1.03:2014-07-05 Prj: EIA 1.03:2014-07-05



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BOREHOLE: BH11

Project	Detailed Site Investigation			Sheet	1 OF 1
Location	9 Albert Street and 31 O'Connell Street, North Parramatta NSW			Date Started	22/3/22
Position	Refer to Figure 2			Date Completed	22/3/22
Job No.	E25473.E02	Contractor	Hartgeo Pty Ltd	Logged AS	Date:22/3/22
Client	Peterose Pty Ltd	Drill Rig	Auger Drill	Checked NK	Date:7/07/22
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0		ES 0.05-0.10 m			-	ASPHALT: 50 mm thick.	-	-	ASPHALT
				0.50				-	FILL: Clayey GRAVEL; fine to coarse, sub-rounded to sub-angular gravels, medium plasticity, with rootlets, no odour.	M - W	-	FILL
				0.70	ES 0.60-0.70 m			CI	Sandy CLAY; medium plasticity, orange, with trace fine to medium, sub-rounded ironstone gravels, no odour.	M	-	NATURAL
			1						From 0.5 m, orange mottled grey, no odour.			
									Borehole Terminated at 0.70 mBGL; Target Depth Reached.			
			2									
			3									
			4									
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

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BOREHOLE: BH12

Project	Detailed Site Investigation			Sheet	1 OF 1
Location	9 Albert Street and 31 O'Connell Street, North Parramatta NSW			Date Started	22/3/22
Position	Refer to Figure 2			Date Completed	22/3/22
Job No.	E25473.E02	Contractor	Hartgeo Pty Ltd	Logged AS	Date:22/3/22
Client	Peterose Pty Ltd	Drill Rig	Auger Drill	Checked NK	Date:7/07/22
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0	0.20	ES 0.10-0.20 m			-	ASPHALT; 50 mm thick.	-	-	ASPHALT
								-	FILL: Silty CLAY; medium plasticity, light brown, with trace fine to coarse, sub-rounded gravels, no odour.	M	-	FILL
				0.50	ES 0.40-0.50 m			CI	Sandy CLAY; medium plasticity, light grey mottled orange, with trace fine to medium, sub-rounded ironstone gravels, no odour.	D	-	NATURAL
			1						Borehole Terminated at 0.50 mBGL; Refusal on Highly Weathered Sandstone.			
			2									
			3									
			4									
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

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BOREHOLE: BH13

Project	Detailed Site Investigation			Sheet	1 OF 1
Location	9 Albert Street and 31 O'Connell Street, North Parramatta NSW			Date Started	22/3/22
Position	Refer to Figure 2			Date Completed	22/3/22
Job No.	E25473.E02	Contractor	Hartgeo Pty Ltd	Logged AS	Date:22/3/22
Client	Peterose Pty Ltd	Drill Rig	Auger Drill	Checked NK	Date:7/07/22
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0	0.30	ES 0.20-0.30 m			-	FILL: Silty CLAY; medium plasticity, light brown, with trace fine to coarse, sub-rounded gravels, no odour.	W	-	FILL
				0.70	ES 0.60-0.70 m			CI	Sandy CLAY; medium plasticity, orange mottled grey, with trace fine to medium, sub-rounded ironstone gravels, no odour.	M	-	NATURAL
			1						Borehole Terminated at 0.70 mBGL; Refusal on Highly Weathered Sandstone.			
			2									
			3									
			4									
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

EIA LIB 1.03.GLB Log IS AU BOREHOLE 3 E25473.E02 BOREHOLE LOGS.GPJ <<DrawingFile>> 05/04/2022 10:19 10.0.000 Datgel Lab and In Situ Tool - DGD | Lib: EIA 1.03.2014-07-05 Prj: EIA 1.03.2014-07-05

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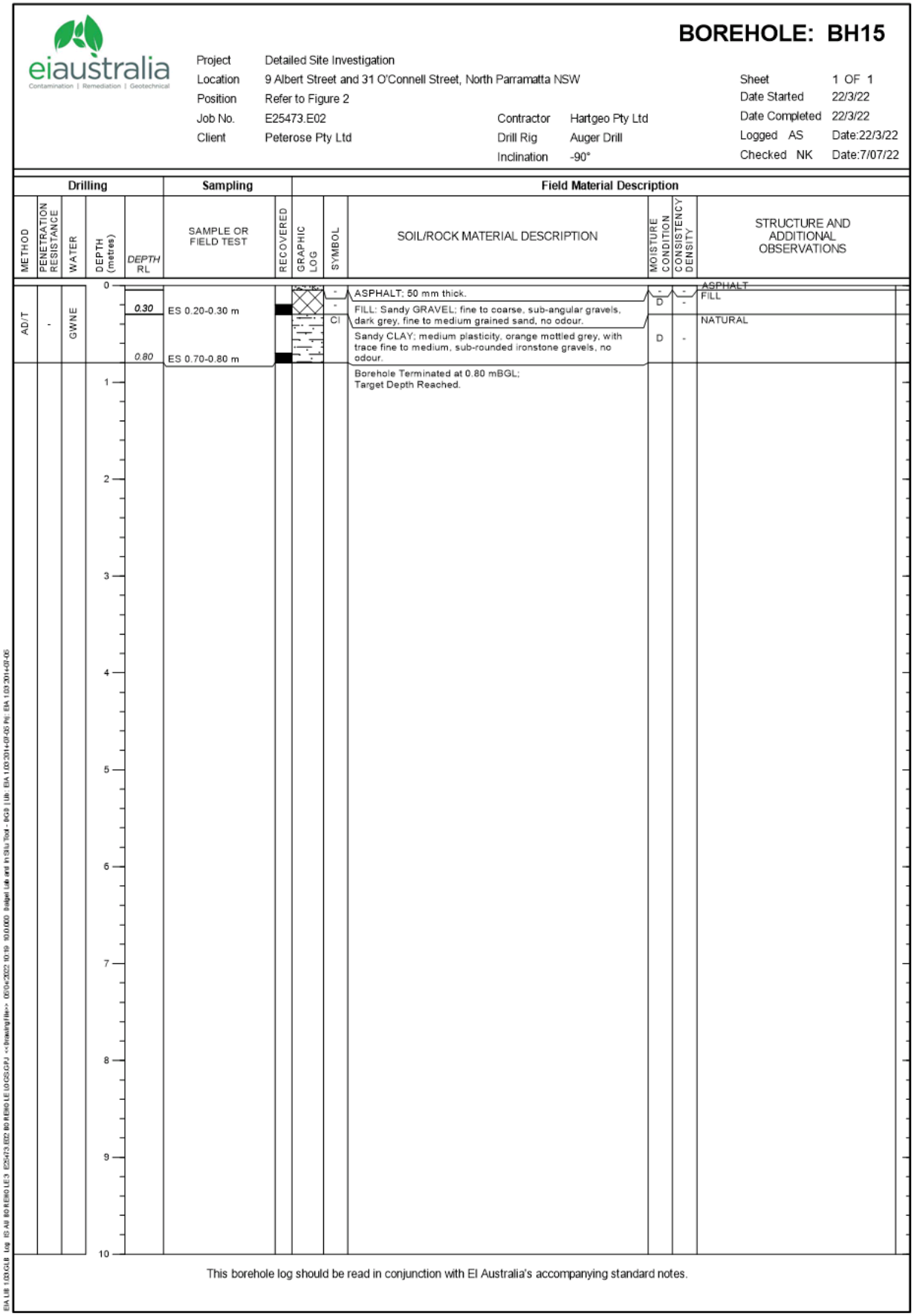
BOREHOLE: BH14

Project	Detailed Site Investigation			Sheet	1 OF 1
Location	9 Albert Street and 31 O'Connell Street, North Parramatta NSW			Date Started	22/3/22
Position	Refer to Figure 2			Date Completed	22/3/22
Job No.	E25473.E02	Contractor	Hartgeo Pty Ltd	Logged AS	Date:22/3/22
Client	Peterose Pty Ltd	Drill Rig	Auger Drill	Checked NK	Date:7/07/22
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0	0.20	ES 0.10-0.20 m			-	FILL: Silty CLAY; medium plasticity, light brown, with trace fine to coarse, sub-rounded gravels, no odour.	M	-	FILL
				0.60	ES 0.50-0.60 m			CI	Sandy CLAY; medium plasticity, grey mottled orange, with trace fine to medium, sub-rounded ironstone gravels, no odour.	D	-	NATURAL
									Borehole Terminated at 0.60 mBGL; Target Depth Reached.			

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

EIA LIB 1.03.GLB Log IS AU BOREHOLE 3 E25473.E02 BOREHOLE LOGS.GPJ <<DrawingFile>> 05/04/2022 10:19 10.0.000 Datgel Lab and In Situ Tool - DGD | Lib: EIA 1.03.2014-07-05 Prj: EIA 1.03.2014-07-05



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BOREHOLE: BH15

Project	Detailed Site Investigation			Sheet	1 OF 1
Location	9 Albert Street and 31 O'Connell Street, North Parramatta NSW			Date Started	22/3/22
Position	Refer to Figure 2			Date Completed	22/3/22
Job No.	E25473.E02	Contractor	Hartgeo Pty Ltd	Logged AS	Date:22/3/22
Client	Peterose Pty Ltd	Drill Rig	Auger Drill	Checked NK	Date:7/07/22
		Inclination	-90°		

Drilling					Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0					-	ASPHALT: 50 mm thick.	-	-	ASPHALT
				0.30	ES 0.20-0.30 m			-	FILL: Sandy GRAVEL; fine to coarse, sub-angular gravels, dark grey, fine to medium grained sand, no odour.	D	-	FILL
								CI	Sandy CLAY; medium plasticity, orange mottled grey, with trace fine to medium, sub-rounded ironstone gravels, no odour.	D	-	NATURAL
				0.80	ES 0.70-0.80 m				Borehole Terminated at 0.80 mBGL; Target Depth Reached.			
			1									
			2									
			3									
			4									
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

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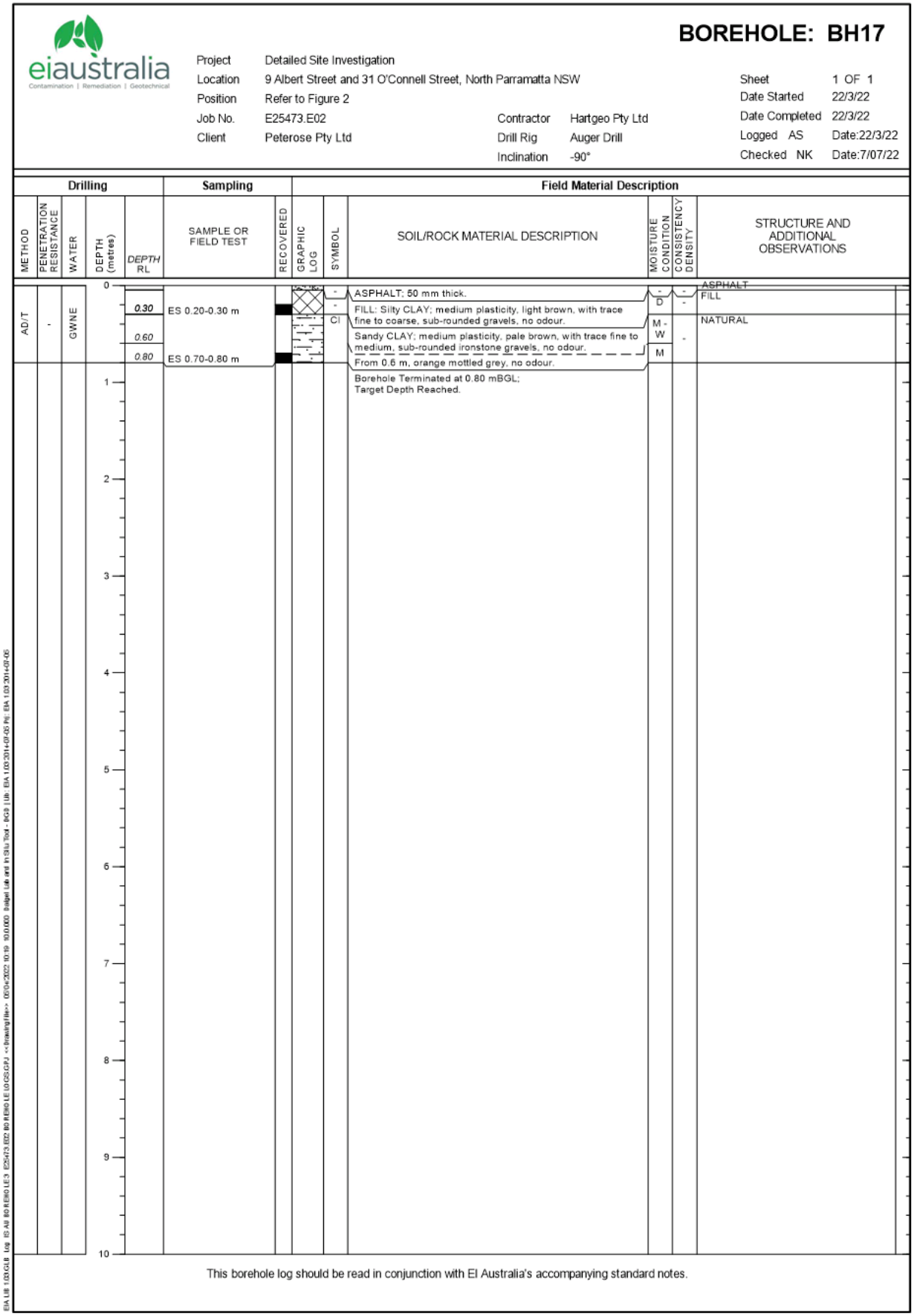
BOREHOLE: BH16

Project	Detailed Site Investigation			Sheet	1 OF 1
Location	9 Albert Street and 31 O'Connell Street, North Parramatta NSW			Date Started	22/3/22
Position	Refer to Figure 2			Date Completed	22/3/22
Job No.	E25473.E02	Contractor	Hartgeo Pty Ltd	Logged AS	Date:22/3/22
Client	Peterose Pty Ltd	Drill Rig	Auger Drill	Checked NK	Date:7/07/22
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0	0.20	ES 0.10-0.20 m			-	FILL: Silty CLAY; medium plasticity, light brown, with trace fine to coarse, sub-rounded gravels, no odour.	M	-	FILL
				0.60	ES 0.50-0.60 m			CI	Sandy CLAY; medium plasticity, orange, with trace fine to medium, sub-rounded ironstone gravels, no odour.	D - M	-	NATURAL
									Borehole Terminated at 0.60 mBGL; Target Depth Reached.			

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

EIA LIB 1.03.GLB Log IS AU BOREHOLE 3 E25473.E02 BOREHOLE LOGS.GPJ <<DrawingFile>> 05/04/2022 10:19 10.0.000 Datgel Lab and In Situ Tool - DGD | Lib: EIA 1.03.2014-07-05 Prj: EIA 1.03.2014-07-05



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BOREHOLE: BH17

Project	Detailed Site Investigation			Sheet	1 OF 1
Location	9 Albert Street and 31 O'Connell Street, North Parramatta NSW			Date Started	22/3/22
Position	Refer to Figure 2			Date Completed	22/3/22
Job No.	E25473.E02	Contractor	Hartgeo Pty Ltd	Logged AS	Date:22/3/22
Client	Peterose Pty Ltd	Drill Rig	Auger Drill	Checked NK	Date:7/07/22
		Inclination	-90°		

Drilling					Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0					-	ASPHALT: 50 mm thick.	-	-	ASPHALT
				0.30	ES 0.20-0.30 m			-	FILL: Silty CLAY; medium plasticity, light brown, with trace fine to coarse, sub-rounded gravels, no odour.	D	-	FILL
				0.60				CI	Sandy CLAY; medium plasticity, pale brown, with trace fine to medium, sub-rounded ironstone gravels, no odour.	M - W	-	NATURAL
				0.80	ES 0.70-0.80 m				From 0.6 m, orange mottled grey, no odour.	M		
			1						Borehole Terminated at 0.80 mBGL; Target Depth Reached.			
			2									
			3									
			4									
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH18M

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Project	Detailed Site Investigation			Sheet	1 OF 1
Location	9 Albert Street and 31 O'Connell Street, North Parramatta NSW			Date Started	22/3/22
Position	Refer to Figure 2			Date Completed	22/3/22
Job No.	E25473.E02	Contractor	Geosense Drilling Pty Ltd	Logged AS	Date:22/3/22
Client	Peterose Pty Ltd	Drill Rig	Comacchio Geo 205	Checked NK	Date:7/07/22
		Inclination	-90°		

Drilling					Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	PIEZOMETER DETAILS ID Static Water Level BH18M
AD/T			0	0.20	ES 0.10-0.20 m			-	FILL: Silty CLAY; medium plasticity, light brown, with trace fine to coarse, sub-rounded gravels, no odour.	D	-	Concrete
								CI	Sandy CLAY; medium plasticity, light grey mottled orange, with trace fine to medium, sub-rounded ironstone gravels, no odour.	D	-	
				0.90	ES 0.50-0.60 m			-	SANDSTONE; light grey mottled pink-red, extremely weathered sandstone, no odour.			
			1		ES 1.10-1.20 m							
			2									Bentonite
			3	3.00					From 3.0 m, orange-white, no odour.			
			4									
Air Compressor			5							D	-	
			6									uPVC 50 mm Casing
			7									Sand
			8									uPVC 50 mm Screen
			9	9.00					Borehole Terminated at 9.00 mBGL; Target Depth Reached.			
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

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Contamination | Remediation | Geotechnical

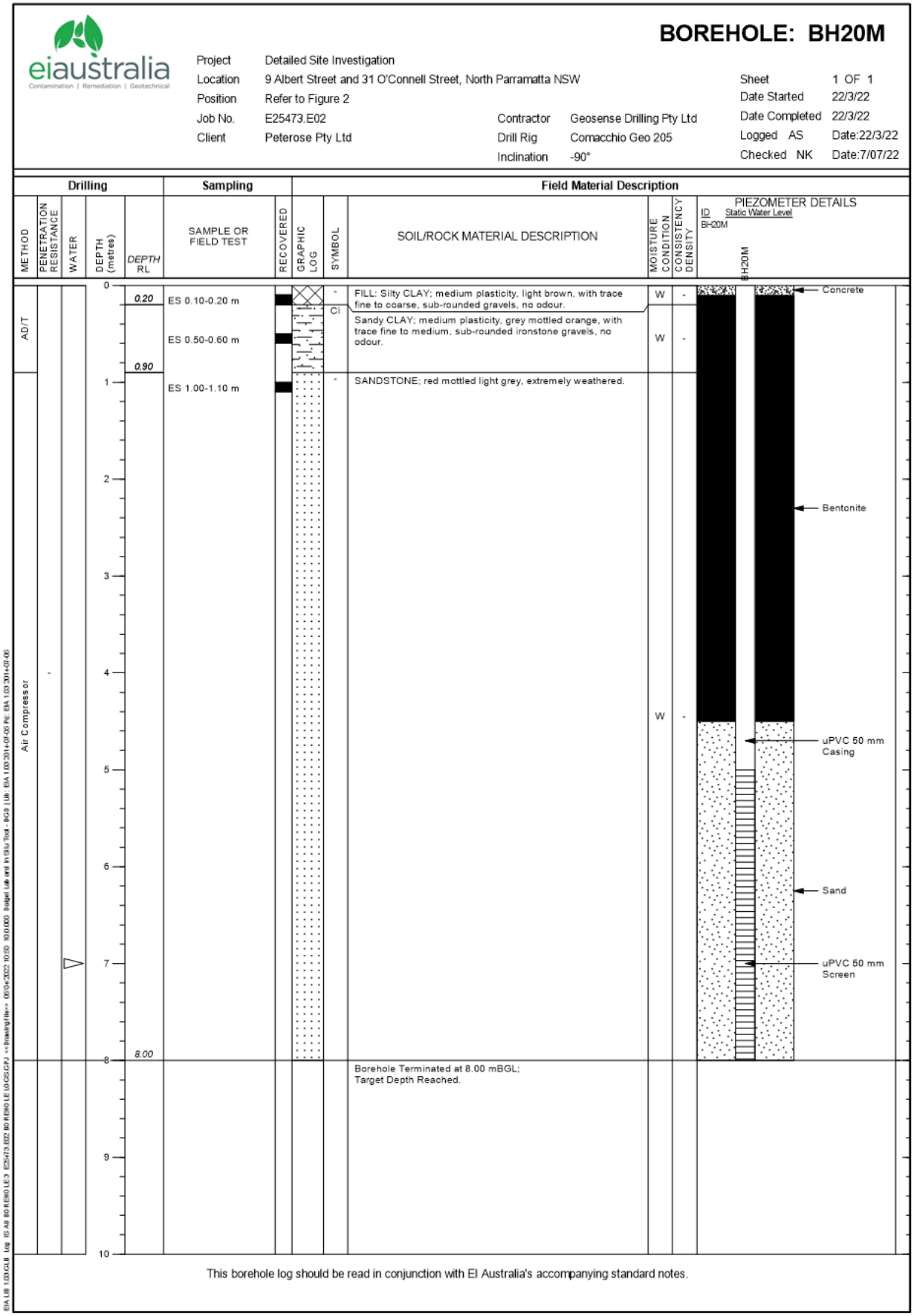
BOREHOLE: BH19

Project	Detailed Site Investigation			Sheet	1 OF 1
Location	9 Albert Street and 31 O'Connell Street, North Parramatta NSW			Date Started	22/3/22
Position	Refer to Figure 2			Date Completed	22/3/22
Job No.	E25473.E02	Contractor	Hartgeo Pty Ltd	Logged AS	Date:22/3/22
Client	Peterose Pty Ltd	Drill Rig	Auger Drill	Checked NK	Date:7/07/22
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0	0.10	ES 0.05-0.10 m			-	FILL: Silty CLAY; medium plasticity, light brown, with trace fine to coarse, sub-rounded gravels, no odour.	D	-	FILL
				0.30	ES 0.20-0.30 m			CI	Sandy CLAY; medium plasticity, orange, with trace fine to medium, sub-rounded ironstone gravels, no odour.	D	-	NATURAL
									Borehole Terminated at 0.30 mBGL; Refusal on Extremely Weathered Sandstone.			

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

EIA LIB 1.03.GLB Log IS AU BOREHOLE 3 E25473.E02 BOREHOLE LOGS.GPJ <<DrawingFile>> 05/04/2022 10:19 10.0.000 Datgel Lab and In Situ Tool - DGD | Lib: EIA 1.03 2014-07-05 Prj: EIA 1.03 2014-07-05


BOREHOLE: BH20M
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Contamination | Remediation | Geotechnical
Project Detailed Site Investigation
Location 9 Albert Street and 31 O'Connell Street, North Parramatta NSW
Position Refer to Figure 2
Job No. E25473.E02
Client Peterose Pty Ltd
Contractor Geosense Drilling Pty Ltd
Drill Rig Comacchio Geo 205
Inclination -90°
Sheet 1 OF 1
Date Started 22/3/22
Date Completed 22/3/22
Logged AS Date:22/3/22
Checked NK Date:7/07/22
Drilling
Sampling
Field Material Description
METHOD
PENETRATION RESISTANCE
WATER
DEPTH (metres)
DEPTH RL
SAMPLE OR FIELD TEST
RECOVERED
GRAPHIC LOG
SYMBOL
SOIL/ROCK MATERIAL DESCRIPTION
MOISTURE CONDITION
CONSISTENCY DENSITY
PIEZOMETER DETAILS
ID Static Water Level
BH20M
AD/T
Air Compressor
0.20
ES 0.10-0.20 m
FILL: Silty CLAY; medium plasticity, light brown, with trace fine to coarse, sub-rounded gravels, no odour.
CI
Sandy CLAY; medium plasticity, grey mottled orange, with trace fine to medium, sub-rounded ironstone gravels, no odour.
ES 0.50-0.60 m
0.90
ES 1.00-1.10 m
SANDSTONE; red mottled light grey, extremely weathered.
8.00
Borehole Terminated at 8.00 mBGL;
Target Depth Reached.
Concrete
Bentonite
uPVC 50 mm Casing
Sand
uPVC 50 mm Screen
This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

WATER SAMPLING FIELD SHEET

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Site Address: 9 Albert & 31 O'Connell St, Parramatta	Job Number: EZ5473
Client: Ceerose	Date: 29/3/22
Field Staff: MC	Sampling Location ID BH20M
Well Location: see map	Round No: 1
MEDIUM ☒Groundwater ☐Surface Water	☐Stormwater ☐Other:
SAMPLING POINT INFO	
Well Installation Date: 22/3/22	Stick up / down (m): +1.070 (+ above ground - below ground)
Initial Well Depth (mBTOC): 8.0	Screen Interval (mBTOC): 8.5 - 3m
Previous Sampling Date: N/A	Previous SWL (mBTOC): N/A
PID READINGS	
PID Headspace (ppm):	PID Background (ppm):
PID Breathing Space (ppm):	
PRE PURGE	
Total Well Depth (mBTOC): 9.004	Well Head Condition: good
SWL (mBTOC): 1.991	Water Column (m): 7.013
PHASE SEPARATED HYDROCARBONS (PSH)	
Depth to PSH (mBTOC):	PSH Visually Confirmed (Bailer):
PSH Thickness (mm):	
Field Filtered	
Yes (0.45 µm) ☒	No ☐ (Request lab 0.45 µm filter the sample)
PURGE AND SAMPLE	
Sampling Method ☐Bladder ☒Peristaltic ☐Submersible ☐Other:	
Depth of Pump Inlet (mBTOC):	Fill Timer:
Pump Pressure Regulator (psi):	Discharge Timer:
Weather Conditions:	Cycle:
Pump on time:	Pump off time:
WATER QUALITY PARAMETERS	
Probe Make and Model:	Bump Test Date and Time:

Time	Volume (L)	SWL (mbtoc)	Temp (°C)	EC (µS/cm)	Redox (mV)	DO (mg/L)	pH (units)	Comments (colour, turbidity, odour, sheen etc.)
12:15		2.226	23.66	1072	266.6	5.9	3.46	low grey & turbidity, no odour
12:17		2.496	23.38	1088	213.4	5.91	3.45	no sheen
12:19		2.661	23.63	1092	201.8	5.60	4.65	
12:21		2.881	23.15	1094	189.1	5.26	4.80	
12:23		2.947	23.15	1038	189.8	5.19	4.84	
12:25		3.003	23.64	1002	180.8	4.97	4.87	
12:27		3.119	23.64	90	786	4.82	4.90	
Stabilisation range: 3 consecutive readings			±0.2°C	±3%	±20mV	±10%	±0.2	

OTHER COMMENTS/OBSERVATIONS: DW-BH20M-1

SIGNATURE: MC

Rev 1 20150604SH
Form OP 017

C:\Users\mchandra\Desktop\Field Forms\Water Sampling Field Sheet_Current June 2021

WATER SAMPLING FIELD SHEET

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Site Address: 9-Albert 31 O'Connell St, Parramatta	Job Number: E25473
Client: Ceerose	Date: 29/3/22
Field Staff: MC	Sampling Location ID BH2M
Well Location: BH2M - see attached map	Round No:
MEDIUM ☑Groundwater ☐Surface Water	☐Stormwater ☐Other:
SAMPLING POINT INFO	
Well Installation Date: 22/3/22	Stick up / ~~down~~ (m): 0.1 (+ above ground - below ground)
Initial Well Depth (mBTOC): 9.0m	Screen Interval (mBTOC): 9.6 - 3m
Previous Sampling Date: NA	Previous SWL (mBTOC): Dry
PID READINGS	
PID Headspace (ppm):	PID Background (ppm):
PID Breathing Space (ppm):	
PRE PURGE	
Total Well Depth (mBTOC): 9.003	Well Head Condition: good
SWL (mBTOC): 0.991	Water Column (m): 8.012
PHASE SEPARATED HYDROCARBONS (PSH)	
Depth to PSH (mBTOC):	PSH Visually Confirmed (Bailer):
PSH Thickness (mm):	
Field Filtered	
Yes (0.45 µm) ☑	No ☐ (Request lab 0.45 µm filter the sample)
PURGE AND SAMPLE	
Sampling Method ☐Bladder ☑Peristaltic	☐Submersible ☐Other:
Depth of Pump Inlet (mBTOC):	Fill Timer:
Pump Pressure Regulator (psi):	Discharge Timer:
Weather Conditions:	Cycle:
Pump on time:	Pump off time:
WATER QUALITY PARAMETERS	
Probe Make and Model:	Bump Test Date and Time:

Time	Volume (L)	SWL (mbtoc)	Temp (°C)	EC (µS/cm)	Redox (mV)	DO (mg/L)	pH (units)	Comments (colour, turbidity, odour, sheen etc.)
10:22			23.25	2599	243.7	3.89	5.99	light grey, low to no turbidity
10:24		~~0.882~~	23.~~19~~	2688	213.4	0.71	5.69	no odour, no sheen
10:26		~~0.980~~	23.~~10~~	2324	175.2	0.12	5.77	
10:28		1.025	23.00	2289	162.2	0.05	5.77	
10:30		1.135	23.03	2289	147.0	0.06	5.79	
10:32		2.228	23.04	2200	140.2	0.07	5.78	
Stabilisation range: 3 consecutive readings			±0.2°C	±3%	±20mV	±10%	±0.2	

OTHER COMMENTS/OBSERVATIONS: GW-BH2M-4 DD & PT.

SIGNATURE: MC

Rev 1 20150604SH
Form OP 017

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WATER SAMPLING FIELD SHEET

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Site Address: 9 Albert St A 310 corner Parramatta	Job Number: E2573
Client: Ceerose	Date: 29/3/22
Field Staff: MC	Sampling Location ID BH18M
Well Location: See map	Round No:
MEDIUM ☑Groundwater ☐Surface Water	☐Stormwater ☐Other:
SAMPLING POINT INFO	
Well Installation Date: 22/3/22	Stick up / down (m): -0.1 (+ above ground - below ground)
Initial Well Depth (mBTOC): 9.0	Screen Interval (mBTOC): ~~9-3m~~ 9-6-3m
Previous Sampling Date: N/A	Previous SWL (mBTOC): –
PID READINGS	
PID Headspace (ppm):	PID Background (ppm):
PID Breathing Space (ppm):	
PRE PURGE	
Total Well Depth (mBTOC): ~~9.0~~ 9.001	Well Head Condition: good
SWL (mBTOC): 3.111	Water Column (m): 5.89
PHASE SEPARATED HYDROCARBONS (PSH)	
Depth to PSH (mBTOC):	PSH Visually Confirmed (Bailer):
PSH Thickness (mm):	
Field Filtered	
Yes (0.45 µm) ☑	No ☐ (Request lab 0.45 µm filter the sample)
PURGE AND SAMPLE	
Sampling Method ☐Bladder ☑Peristaltic ☐Submersible ☐Other:	
Depth of Pump Inlet (mBTOC):	Fill Timer:
Pump Pressure Regulator (psi):	Discharge Timer:
Weather Conditions:	Cycle:
Pump on time:	Pump off time:
WATER QUALITY PARAMETERS	
Probe Make and Model:	Bump Test Date and Time:

Time	Volume (L)	SWL (mbtoc)	Temp (°C)	EC (µS/cm)	Redox (mV)	DO (mg/L)	pH (units)	Comments (colour, turbidity, odour, sheen etc.)
11:28		3.[illegible]	22.83	392	258.8	5.97	3.68	Light grey clear
11:30		3.098	22.78	322	237.9	6.26	3.67	
11:32		3.118	22.75	277	214.7	6.60	3.66	Low to no turbidity
11:34		3.234	22.73	260	200.9	6.53	3.68	
11:36		3.446	22.70	246	189.6	6.22	3.69	No odour
11:38		3.581	22.89	242	183.1	5.83	3.70	No sheen
Stabilisation range: 3 consecutive readings			±0.2°C	±3%	±20mV	±10%	±0.2	

OTHER COMMENTS/OBSERVATIONS:

GW-BH18M-1

SIGNATURE: MC

Rev 1 20150604SH
Form OP 017

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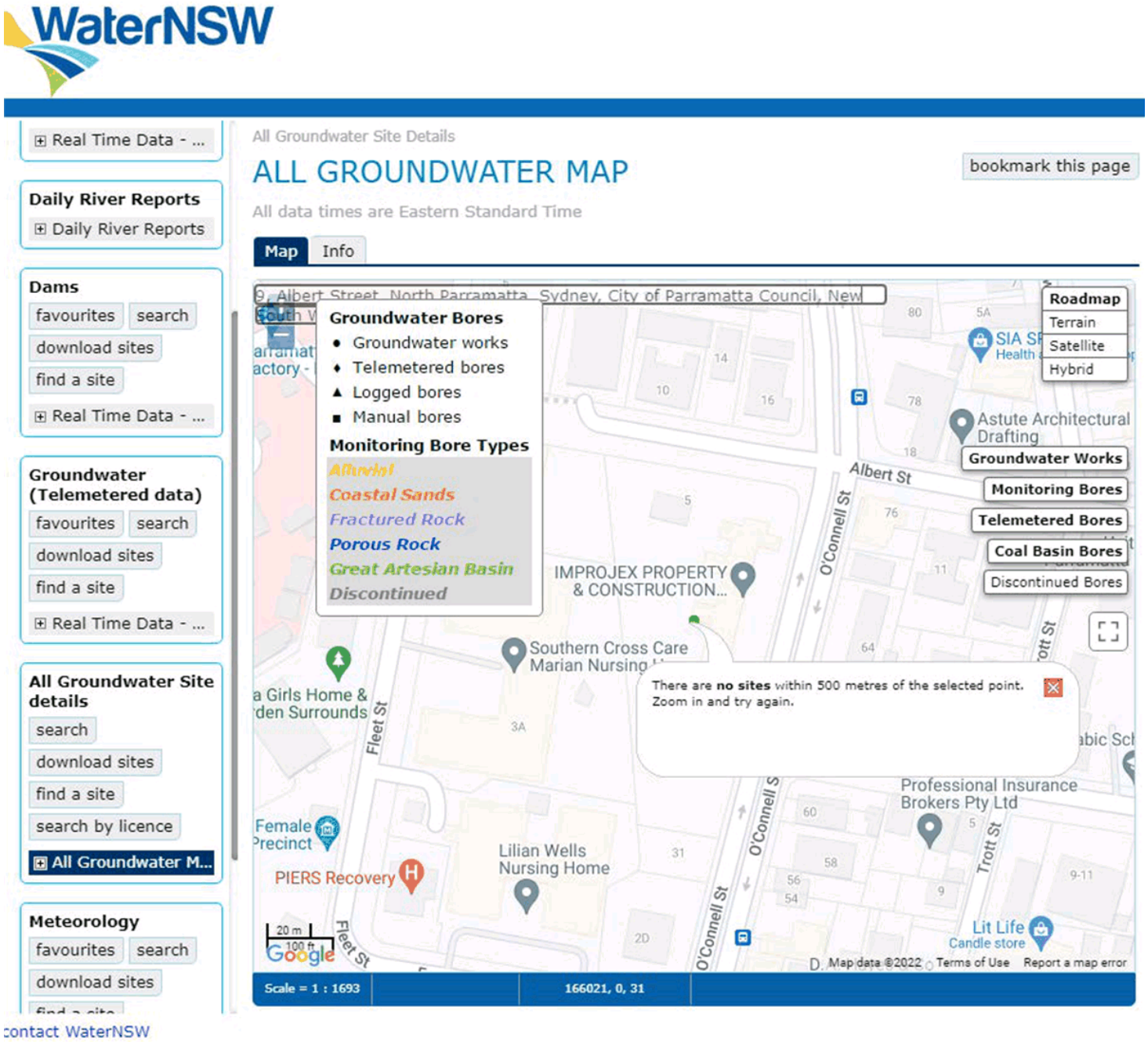
Appendix F – Groundwater Bore Search


WaterNSW
Real Time Data - ...
Daily River Reports
Daily River Reports
Dams
favourites
search
download sites
find a site
Real Time Data - ...
Groundwater (Telemetered data)
favourites
search
download sites
find a site
Real Time Data - ...
All Groundwater Site details
search
download sites
find a site
search by licence
All Groundwater M...
Meteorology
favourites
search
download sites
contact WaterNSW
All Groundwater Site Details
ALL GROUNDWATER MAP
bookmark this page
All data times are Eastern Standard Time
Map
Info
Groundwater Bores
Groundwater works
Telemetered bores
Logged bores
Manual bores
Monitoring Bore Types
Alluvial
Coastal Sands
Fractured Rock
Porous Rock
Great Artesian Basin
Discontinued
Roadmap
Terrain
Satellite
Hybrid
Groundwater Works
Monitoring Bores
Telemetered Bores
Coal Basin Bores
Discontinued Bores
There are no sites within 500 metres of the selected point.
Zoom in and try again.
Albert St
O'Connell St
Fleet St
Trott St
IMPROJEX PROPERTY & CONSTRUCTION...
Southern Cross Care Marian Nursing
Astute Architectural Drafting
Professional Insurance Brokers Pty Ltd
Lilian Wells Nursing Home
PIERS Recovery
Female Precinct
Lit Life Candle store
Map data ©2022
Terms of Use
Report a map error
Scale = 1 : 1693
166021, 0, 31

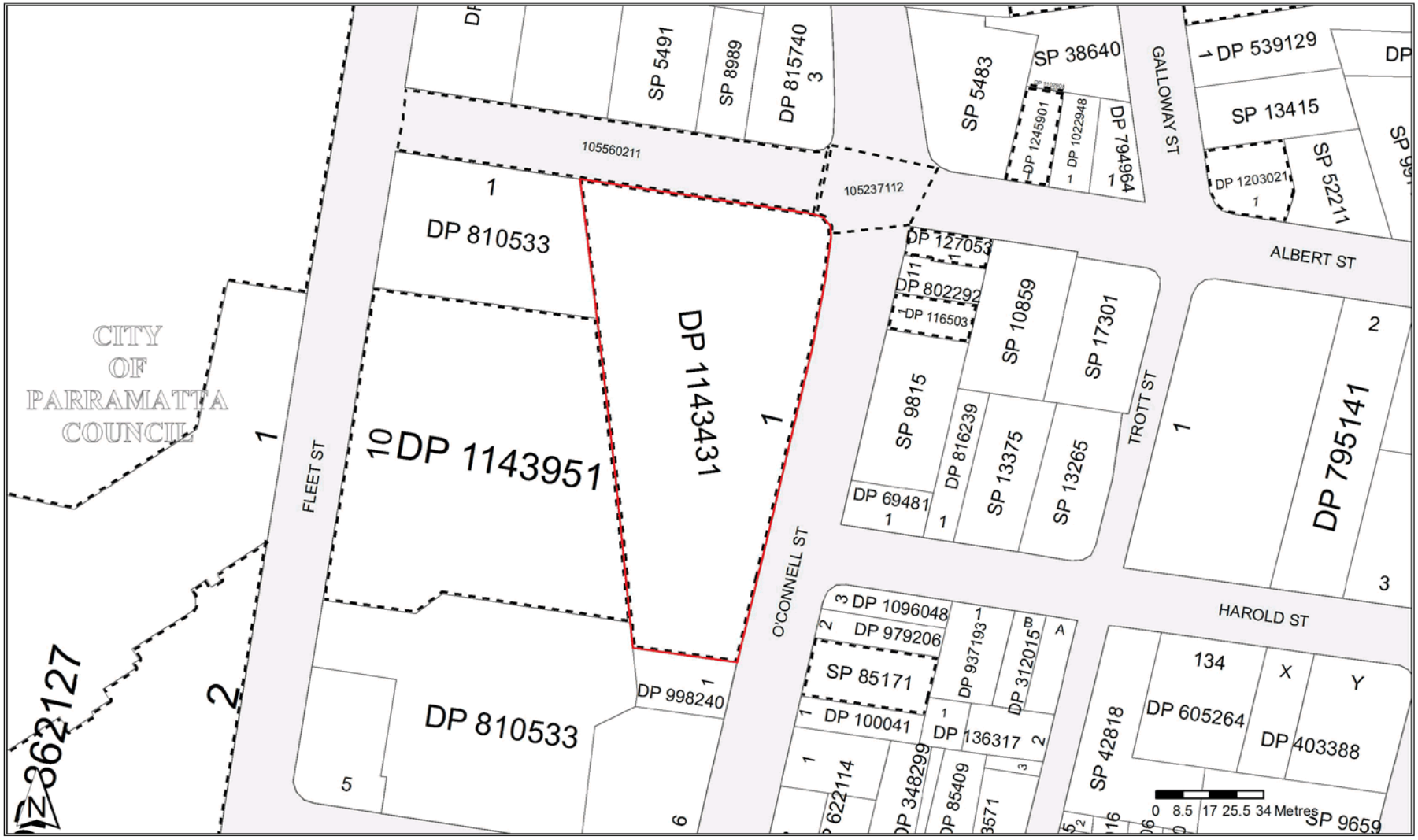
Appendix G – Land Titles

LAND REGISTRY SERVICES

Cadastral Records Enquiry Report : Lot 1 DP 1143431

Ref : 9 Albert St, North Parramatta

Locality : NORTH PARRAMATTA
Parish : FIELD OF MARS
LGA : CITY OF PARRAMATTA
County : CUMBERLAND



Report Generated 10:07:39 AM, 6 January, 2022
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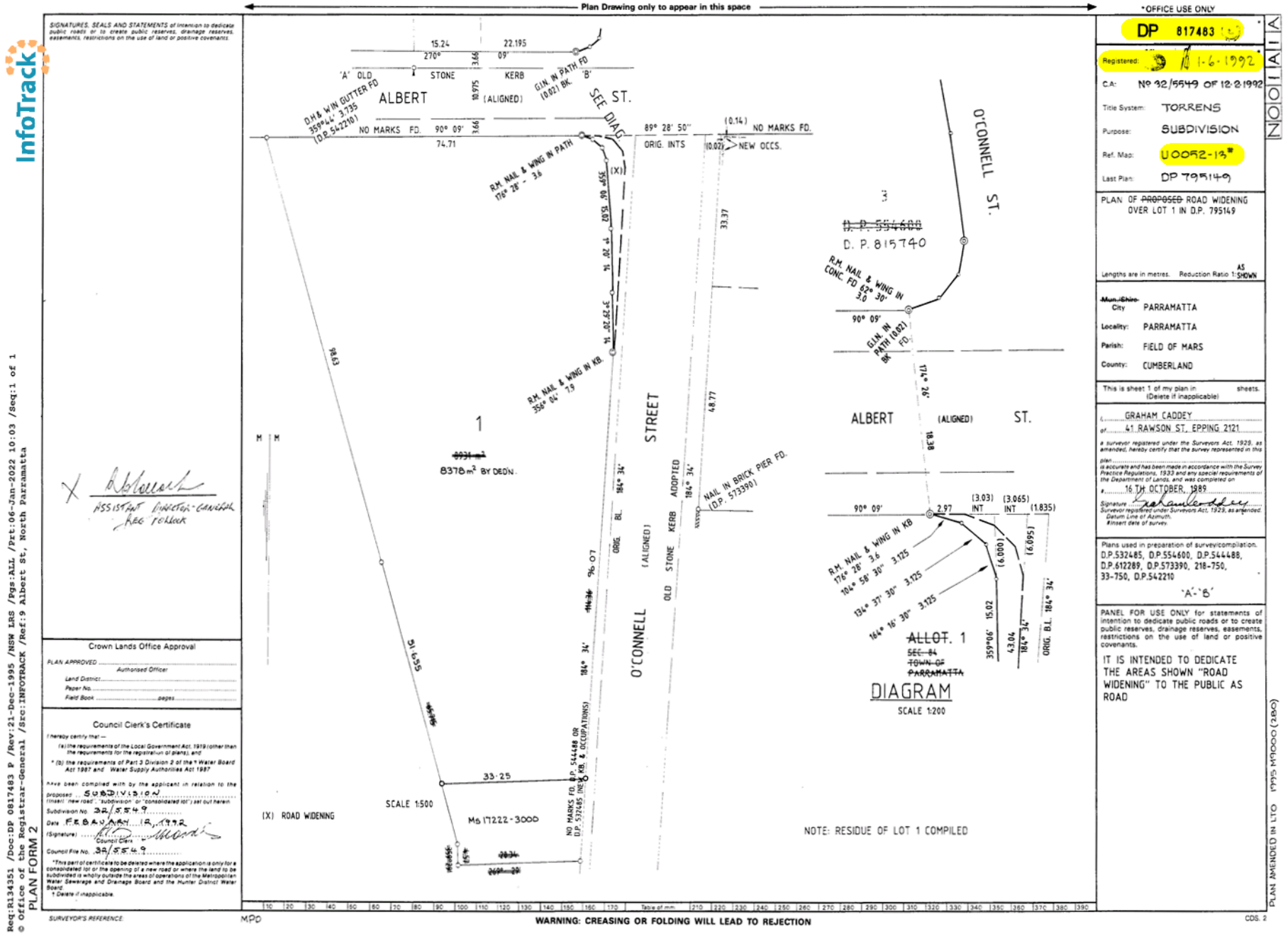
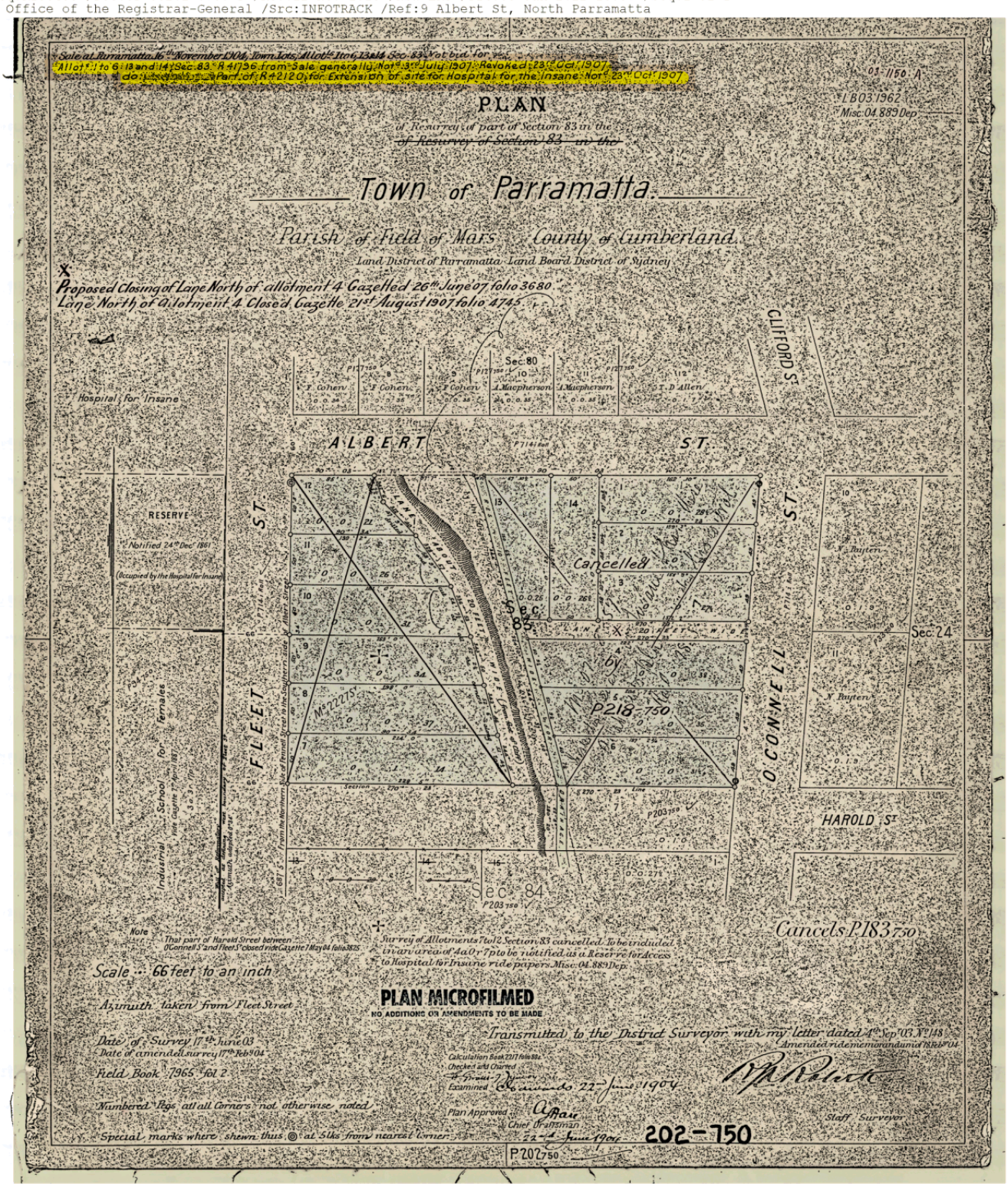
This information is provided as a searching aid only.Whilst every endeavour is made to ensure that current map, plan and titling information is accurately reflected, the Registrar General cannot guarantee the information provided. For ALL ACTIVITY PRIOR TO SEPTEMBER 2002 you must refer to the RGs Charting and Reference Maps

Page 1 of 3


Plan Drawing only to appear in this space
*OFFICE USE ONLY
DP 817483
Registered: 1-6-1992
C.A: Nº 32/5549 OF 12-2-1992
Title System: TORRENS
Purpose: SUBDIVISION
Ref. Map: U0052-13*
Last Plan: DP 795149
PLAN OF PROPOSED ROAD WIDENING OVER LOT 1 IN D.P. 795149
Lengths are in metres. Reduction Ratio 1: AS SHOWN
City PARRAMATTA
Locality: PARRAMATTA
Parish: FIELD OF MARS
County: CUMBERLAND
This is sheet 1 of my plan in sheets. (Delete if inapplicable)
GRAHAM CADDEY
41 RAWSON ST. EPPING 2121
16 TH OCTOBER, 1989
Plans used in preparation of survey/compilation. D.P.532485, D.P.554600, D.P.544488, D.P.612289, D.P.573390, 218-750, 33-750, D.P.542210
'A'-'B'
PANEL FOR USE ONLY for statements of intention to dedicate public roads or to create public reserves, drainage reserves, easements, restrictions on the use of land or positive covenants.
IT IS INTENDED TO DEDICATE THE AREAS SHOWN "ROAD WIDENING" TO THE PUBLIC AS ROAD
SIGNATURES, SEALS AND STATEMENTS of intention to dedicate public roads or to create public reserves, drainage reserves, easements, restrictions on the use of land or positive covenants.
ALBERT ST.
SEE DIAG.
O'CONNELL ST.
O'CONNELL STREET
ALBERT (ALIGNED) ST.
D. P. 815740
8378 m² BY DEDN.
ALLOT. 1
SEC. 84
TOWN OF PARRAMATTA
DIAGRAM
SCALE 1:200
SCALE 1:500
(X) ROAD WIDENING
NOTE: RESIDUE OF LOT 1 COMPILED
Crown Lands Office Approval
Council Clerk's Certificate
PLAN FORM 2
WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION
PLAN AMENDED IN LTO 1995 M9000 (280)
Req:R134351 /Doc:DP 0817483 P /Rev:21-Dec-1995 /NSW LRS /Pgs:ALL /Prt:06-Jan-2022 10:03 /Seq:1 of 1
© Office of the Registrar-General /Src:INFOTRACK /Ref:9 Albert St, North Parramatta

Req:R133455 /Doc:CP 00202-0750 P /Rev:22-Nov-2013 /NSW LRS /Prt:05-Jan-2022 15:57 /Seq:1 of 1
© Office of the Registrar-General /Src:INFOTRACK /Ref:9 Albert St, North Parramatta



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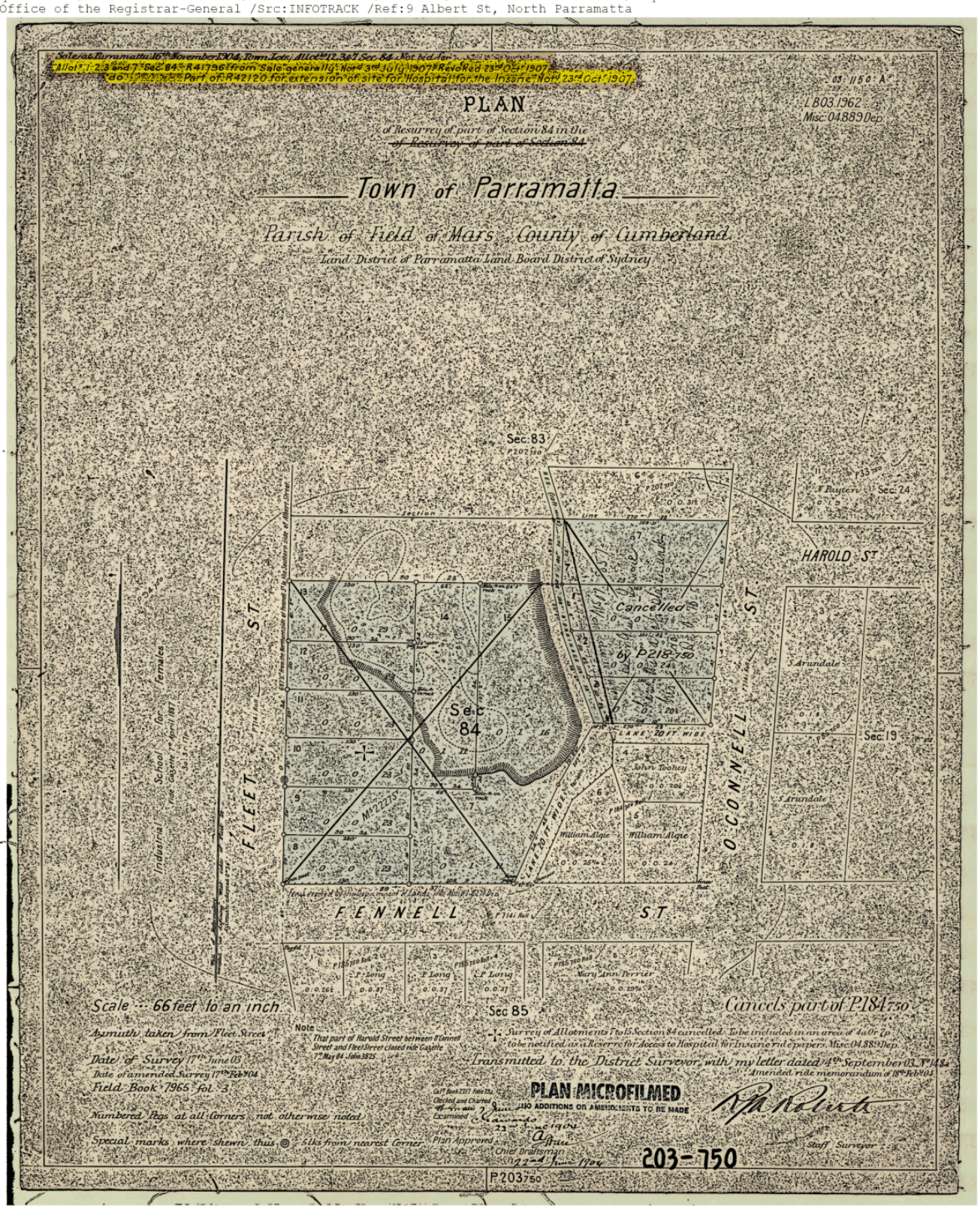

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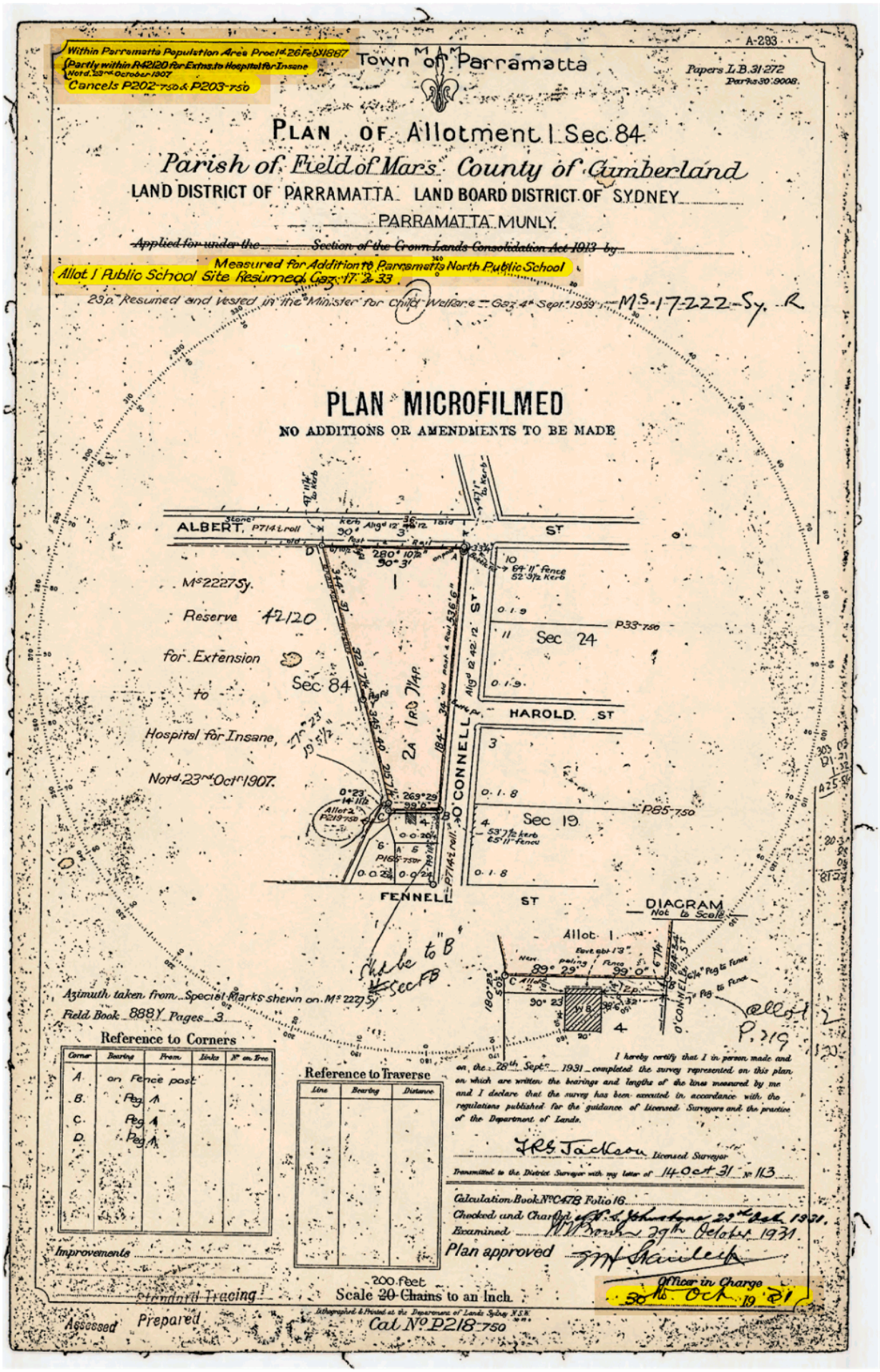

NOTIFICATION OF RESUMPTION OF AN EASEMENT UNDER THE PUBLIC WORKS ACT, 1912, AS AMENDED BY THE PUBLIC WORKS (PORT KEMBLA ELECTRICITY) ACT, 1929.

IT is hereby notified and declared by His Excellency the Lieutenant-Governor, acting with the advice of the Executive Council, that an easement or right to use in any manner and for the purposes specified in subsection 1 of section 4A of the Public Works Act, 1912, as amended by the Public Works (Port Kembla Electricity) Act, 1929, the surface of the land described in the Schedule hereto is hereby appropriated or resumed according as the said land is Crown Land or private property respectively for the construction and maintenance of works authorised by the Public Works (Port Kembla Electricity) Act, 1929, and the said easement or right is vested in the Minister for Public Works as Constructing Authority for the purposes of the lastmentioned Act.

(Ms. 1932-3,537)

Dated this 31st day of January, 1933.

P. W. STREET, Lieutenant-Governor.

By His Excellency's Command,

R. W. D. WEAVER, Minister for Public Works.

All that piece or parcel of land 100 feet wide situate in Wingecarribee Shire, parish of Yarrunga, county of Camden, and State of New South Wales, being part of portions 282 and 283 comprised in Certificate of Title, registered volume 4,515, folio 239: Commencing on the eastern boundary of 50 acres comprised in the said Certificate of Title, registered volume 4,515, folio 239, at a point bearing 180 degrees 21 minutes and distant 81 feet 6 inches from its north-eastern corner; and bounded thence on the east by part of the said eastern boundary of that land bearing 180 degrees 21 minutes 105 feet 5 inches; on the south generally by lines bearing successively 288 degrees 51 minutes 68 feet 1½ minutes and 271 degrees 8 minutes 752 feet 6 inches; on the west by part of the western boundary of the aforesaid 50 acres comprised in Certificate of Title, registered volume 4,515, folio 239, bearing 21 minutes 100 feet; and on the north generally by lines bearing successively 91 degrees 8 minutes 769 feet 6 inches and 108 degrees 51 minutes 50 feet 3 inches, to the point of commencement,—having an area of 1 acre 3 roods 21 perches or thereabouts, and said to be in the possession of Florence Emily Gouge. (381)

NOTIFICATION OF RESUMPTION OF LAND UNDER THE PUBLIC WORKS ACT, 1912.

IT is hereby notified and declared by His Excellency the Lieutenant-Governor, acting with the advice of the Executive Council, that so much of the land hereunder described as is Crown Land has been appropriated, and so much thereof as is private property has been resumed, under the Public Works Act, 1912, for the following public purpose, namely, a Public School at PARRAMATTA NORTH, and is vested in the Minister of Public Instruction on behalf of His Majesty the King for the purposes of the Public Instruction Act of 1880.

Dated the thirty-first day of January, one thousand nine hundred and thirty-three.

P. W. STREET, Lieutenant-Governor.

By His Excellency's Command,

D. H. DRUMMOND,
Minister of Public Instruction.

DESCRIPTION OF LAND REFERRED TO.

All that piece or parcel of land situate in the parish of Field of Mars, county of Cumberland, town of Parramatta, Municipality of Parramatta, containing an area of 2 acres 1 rood 7¼ perches, being allotment 1, section 84: Commencing at the intersection of the southern side of Albert-street with the western side of O'Connell-street; and bounded thence by part of the western side of O'Connell-street, bearing 184 degrees 34 minutes distant 536 feet 6 inches to the north-east corner of allotment 2; thence by the northern boundary of that allotment, bearing 269 degrees 29 minutes distant 99 feet to the north-west corner of allotment 2; thence by lines bearing 360 degrees 23 minutes 14 feet 11½ inches, 345 degrees 40 minutes 215 feet 7¼ inches and 344 degrees 37 minutes 323 feet 7¼ inches to the southern side of Albert-street aforesaid; thence by part of that side of that street, bearing 90 degrees 3 minutes 280 feet 10½ inches, to the point of commencement,—and shown on plan P. 218-750 in the Department of Lands, Sydney. (689)

NOTIFICATION OF RESUMPTION OF LAND UNDER THE PUBLIC WORKS ACT, 1912.

IT is hereby notified and declared by His Excellency the Lieutenant-Governor, acting with the advice of the Executive Council, that so much of the land hereunder described as is Crown Land has been appropriated, and so much thereof as is private property has been resumed, under the Public Works Act, 1912, for the following

LAND REGISTRY SERVICES

Historical Title

InfoTrack

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
5/1/2022 3:35PM

FOLIO: 1/795149

First Title(s): OLD SYSTEM
Prior Title(s): CA42546

Recorded	Number	Type of Instrument	C.T. Issue
8/11/1989	CA42546	CONVERSION ACTION	FOLIO CREATED EDITION 1
4/6/1992	DP817483	DEPOSITED PLAN	FOLIO CANCELLED RESIDUE REMAINS
10/8/2016	AK666945	DEPARTMENTAL DEALING	

*** END OF SEARCH ***

9 Albert St, North Parramatta PRINTED ON 5/1/2022

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Received: 05/01/2022 15:35:51

LAND REGISTRY SERVICES

Historical Title

InfoTrack

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
5/1/2022 3:35PM

FOLIO: 1/817483

First Title(s): OLD SYSTEM
Prior Title(s): 1/795149

Recorded	Number	Type of Instrument	C.T. Issue
4/6/1992	DP817483	DEPOSITED PLAN	FOLIO CREATED EDITION 1
1/2/1996	O881765	DEPARTMENTAL DEALING	
4/12/2008	AE367890	REQUEST	
4/12/2008	AE367891	TRANSFER	EDITION 2
30/9/2009	DP1143431	DEPOSITED PLAN	FOLIO CANCELLED

*** END OF SEARCH ***

9 Albert St, North Parramatta PRINTED ON 5/1/2022

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Received: 05/01/2022 15:35:41

Req:R133392 /Doc:DL AE367891 /Rev:05-Dec-2008 /NSW LRS /Pgs:ALL /Prt:05-Jan-2022 15:36 /Seq:1 of 2
© Office of the Registrar-General /Src:INFOTRACK /Ref:9 Albert St, North Parramatta

Form: 01T
Licence: 05-11-638
Licensee: Softdocs
New South Wales Land and Housing Corpora

TRANSFER

New South Wales
Real Property Act 1900

AE367891H

PRIVACY NOTE: Section 31B of the Real Property Act 1900 (RP Act) authorises the Reg by this form for the establishment and maintenance of the Real Property Act Register. Section 96B RP Act requires that ... made available to any person for search upon payment of a fee, if any.

STAMP DUTY Office of State Revenue use only

Office of State Revenue
NSW Treasury
Client No: 97540542 2058
Duty: EXEMPT Trans No: 5217499
Asst details: S308

(A) FOLIO OF THE REGISTER 1/817483

(B) LODGED BY

Document Collection Box	Name, Address or DX, Telephone, and LLPN if any	CODE
416Q	LLPN: 123287M NEW SOUTH WALES LAND AND HOUSING CORPORATION DX 21226 ASHFIELD Tel: 8753 8999 Reference (optional): Dam:20080990:Nth Parramatta	T TW (Sheriff)

(C) TRANSFEROR MINISTER FOR EDUCATION AND TRAINING

(D) CONSIDERATION The transferor acknowledges receipt of the consideration of $ 4,350,000.00 and as regards the folio

(E) ESTATE of the Register specified above transfers to the transferee an estate in fee simple.

(F) SHARE TRANSFERRED

(G) Encumbrances (if applicable):

(H) TRANSFEREE NEW SOUTH WALES LAND AND HOUSING CORPORATION ABN 45 754 121 940

(I) **TENANCY:**

DATE 19 / 11 / 2008

(J) I certify that the person(s) signing opposite, with whom I am personally acquainted or as to whose identity I am otherwise satisfied, signed this instrument in my presence.

Certified correct for the purposes of the Real Property Act 1900 by the transferor.

SEE ANNEXURE 'X' FOR EXECUTION BY TRANSFEROR

Signature of witness:

Signature of transferor:

Name of witness:
Address of witness:

I certify that the person(s) signing opposite, with whom I am personally acquainted or as to whose identity I am otherwise satisfied, signed this instrument in my presence.

Certified correct for the purposes of the Real Property Act 1900 by the transferee.

Signature of witness: D McGrath

Name of witness: DEBRA McGRATH
Address of witness: 223-239 Liverpool Rd
Ashfield 2131

Signature of transferee:

SIGNED by me DANA LOWE as Delegate of the New South Wales Land and Housing Corporation and I hereby certify that I have no notice of the revocation of such delegation.

All handwriting must be in block capitals. **Page 1 of 1** **Number additional pages sequentially**

Req:R133392 /Doc:DL AE367891 /Rev:05-Dec-2008 /NSW LRS /Pgs:ALL /Prt:05-Jan-2022 15:36 /Seq:2 of 2
© Office of the Registrar-General /Src:INFOTRACK /Ref:9 Albert St, North Parramatta

ANNEXURE "X"

I certify that the person(s) signing opposite, with whom I am personally acquainted or as to whose identity I am otherwise satisfied, signed this instrument in my presence.

X .....
Signature of Witness

X ROGER MILLOTT
Name of Witness (please print)

10 CASEY DRIVE WYONG
Address of Witness

Certified correct for the purposes of the Real Property Act 1900 by the Applicant.

Signed by me Ray Masterton as delegate of the Minister for Education and Training, Verity Helen Firth, pursuant to Section 125 of the Education Act 1990 and I hereby certify that I have no notice of revocation of such delegation.

X .....
Signature of Ray Masterton as delegate of Verity Helen Firth
Minister for Education and Training

LAND REGISTRY SERVICES

Historical Title

InfoTrack

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
5/1/2022 3:35PM

FOLIO: 1/1143431

First Title(s): OLD SYSTEM
Prior Title(s): 1/817483

Recorded	Number	Type of Instrument	C.T. Issue
30/9/2009	DP1143431	DEPOSITED PLAN	FOLIO CREATED EDITION 1
29/6/2016	AK558617	DEPARTMENTAL DEALING	

*** END OF SEARCH ***

9 Albert St, North Parramatta PRINTED ON 5/1/2022

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Received: 05/01/2022 15:35:34

LAND REGISTRY SERVICES **Title Search** InfoTrack

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 1/1143431

SEARCH DATE	TIME	EDITION NO	DATE
5/1/2022	3:35 PM	1	30/9/2009

LAND

LOT 1 IN DEPOSITED PLAN 1143431
AT NORTH PARRAMATTA
LOCAL GOVERNMENT AREA CITY OF PARRAMATTA
PARISH OF FIELD OF MARS COUNTY OF CUMBERLAND
TITLE DIAGRAM DP1143431

FIRST SCHEDULE

NEW SOUTH WALES LAND AND HOUSING CORPORATION

SECOND SCHEDULE (2 NOTIFICATIONS)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 AE367890 RESTRICTION(S) ON THE USE OF LAND

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

9 Albert St, North Parramatta PRINTED ON 5/1/2022

* Any entries preceded by an asterisk do not appear on the current edition of the Certificate of Title. Warning: the information appearing under notations has not been formally recorded in the Register. InfoTrack an approved NSW Information Broker hereby certifies that the information contained in this document has been provided electronically by the Registrar General in accordance with Section 96B(2) of the Real Property Act 1900.

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Appendix H – Lotsearch Results

LOTSEARCH

LOTSEARCH ENVIRO LITE

Date: 04 Jan 2022 12:03:10

Reference: LS027909 EL

Address: 9 Albert Street, North Parramatta, NSW 2151

Disclaimer:
The purpose of this report is to provide an overview of some of the site history, environmental risk and planning information available, affecting an individual address or geographical area in which the property is located. It is not a substitute for an on-site inspection or review of other available reports and records. It is not intended to be, and should not be taken to be, a rating or assessment of the desirability or market value of the property or its features.
You should obtain independent advice before you make any decision based on the information within the report.
The detailed terms applicable to use of this report are set out at the end of this report.

Dataset Listing

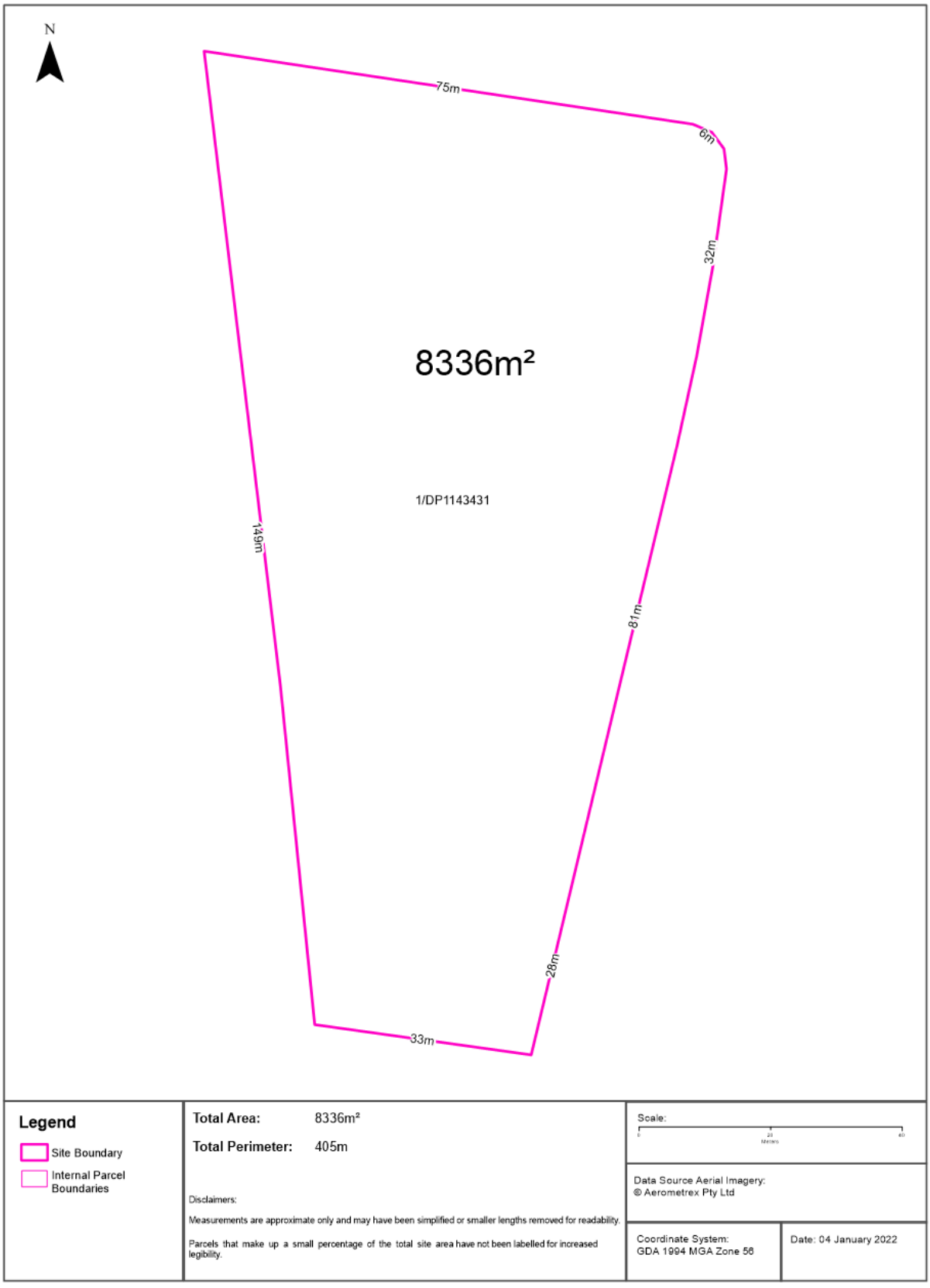
Datasets contained within this report, detailing their source and data currency:

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features On-site	No. Features within 100m	No. Features within Buffer
Cadastre Boundaries	NSW Department of Finance, Services & Innovation	30/06/2021	30/06/2021	Quarterly	-	-	-	-
Topographic Data	NSW Department of Finance, Services & Innovation	25/06/2019	25/06/2019	As required	-	-	-	-
List of NSW contaminated sites notified to EPA	Environment Protection Authority	10/12/2021	09/12/2021	Monthly	1000m	0	0	3
Contaminated Land Records of Notice	Environment Protection Authority	06/12/2021	06/12/2021	Monthly	1000m	0	0	0
Former Gasworks	Environment Protection Authority	11/08/2021	11/10/2017	Quarterly	1000m	0	0	0
National Waste Management Facilities Database	Geoscience Australia	12/05/2021	07/03/2017	Annually	1000m	0	0	0
National Liquid Fuel Facilities	Geoscience Australia	15/02/2021	13/07/2012	Annually	1000m	0	0	1
EPA PFAS Investigation Program	Environment Protection Authority	14/12/2021	14/07/2021	Monthly	2000m	0	0	0
Defence PFAS Investigation & Management Program - Investigation Sites	Department of Defence	29/10/2021	29/10/2021	Monthly	2000m	0	0	0
Defence PFAS Investigation & Management Program - Management Sites	Department of Defence	29/10/2021	29/10/2021	Monthly	2000m	0	0	0
Airservices Australia National PFAS Management Program	Airservices Australia	08/10/2021	08/10/2021	Monthly	2000m	0	0	0
Defence 3 Year Regional Contamination Investigation Program	Department of Defence	19/08/2021	19/08/2021	Quarterly	2000m	0	0	1
EPA Other Sites with Contamination Issues	Environment Protection Authority	02/02/2021	13/12/2018	Annually	1000m	0	0	4
Licensed Activities under the POEO Act 1997	Environment Protection Authority	21/12/2021	21/12/2021	Monthly	1000m	0	0	2
Delicensed POEO Activities still regulated by the EPA	Environment Protection Authority	21/12/2021	21/12/2021	Monthly	1000m	0	0	3
Former POEO Licensed Activities now revoked or surrendered	Environment Protection Authority	21/12/2021	21/12/2021	Monthly	1000m	0	0	5
UBD Business Directories (Premise & Intersection Matches)	Hardie Grant			Not required	100m	0	13	13
UBD Business Directories (Road & Area Matches)	Hardie Grant			Not required	100m	-	14	14
UBD Business Directory Dry Cleaners & Motor Garages/Service Stations (Premise & Intersection Matches)	Hardie Grant			Not required	250m	0	0	26
UBD Business Directory Dry Cleaners & Motor Garages/Service Stations (Road & Area Matches)	Hardie Grant			Not required	250m	-	0	5
Points of Interest	NSW Department of Finance, Services & Innovation	19/08/2021	19/08/2021	Quarterly	1000m	0	5	99
Tanks (Areas)	NSW Department of Customer Service - Spatial Services	19/08/2021	19/08/2021	Quarterly	1000m	0	0	0
Tanks (Points)	NSW Department of Customer Service - Spatial Services	19/08/2021	19/08/2021	Quarterly	1000m	0	0	0
Major Easements	NSW Department of Finance, Services & Innovation	19/08/2021	19/08/2021	Quarterly	1000m	0	0	8
State Forest	Forestry Corporation of NSW	25/02/2021	14/02/2021	Annually	1000m	0	0	0
NSW National Parks and Wildlife Service Reserves	NSW Office of Environment & Heritage	22/01/2021	11/12/2020	Annually	1000m	0	0	0
Hydrogeology Map of Australia	Commonwealth of Australia (Geoscience Australia)	08/10/2014	17/03/2000	As required	1000m	1	1	1
Temporary Water Restriction (Botany Sands Groundwater Source) Order 2018	NSW Department of Planning, Industry and Environment	26/10/2020	21/02/2018	Annually	1000m	0	0	0
Groundwater Boreholes	NSW Dept. of Primary Industries - Water NSW; Commonwealth of Australia (Bureau of Meteorology)	24/07/2018	23/07/2018	Annually	2000m	0	0	20

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features On-site	No. Features within 100m	No. Features within Buffer
Geological Units 1:100,000	NSW Department of Planning, Industry and Environment	20/08/2014		Annually	1000m	1	3	4
Geological Structures 1:100,000	NSW Department of Planning, Industry and Environment	20/08/2014		Annually	1000m	0	0	0
Naturally Occurring Asbestos Potential	NSW Dept. of Industry, Resources & Energy	04/12/2015	24/09/2015	Unknown	1000m	0	0	0
Atlas of Australian Soils	Australian Bureau of Agriculture and Resource Economics and Sciences (ABARES)	19/05/2017	17/02/2011	As required	1000m	1	1	1
Soil Landscapes of Central and Eastern NSW	NSW Department of Planning, Industry and Environment	14/10/2020	27/07/2020	Annually	1000m	1	3	8
Environmental Planning Instrument Acid Sulfate Soils	NSW Department of Planning, Industry and Environment	15/11/2021	05/11/2021	Monthly	500m	1	-	-
Atlas of Australian Acid Sulfate Soils	CSIRO	19/01/2017	21/02/2013	As required	1000m	1	1	3
Dryland Salinity - National Assessment	National Land and Water Resources Audit	18/07/2014	12/05/2013	None planned	1000m	0	0	0
Dryland Salinity Potential of Western Sydney	NSW Department of Planning, Industry and Environment	12/05/2017	01/01/2002	None planned	1000m	2	2	3
Mining Subsidence Districts	NSW Department of Customer Service - Subsidence Advisory NSW	19/08/2021	05/08/2021	Quarterly	1000m	0	0	0
Current Mining Titles	NSW Department of Industry	02/11/2021	02/11/2021	Monthly	1000m	0	0	0
Mining Title Applications	NSW Department of Industry	02/11/2021	02/11/2021	Monthly	1000m	0	0	0
Historic Mining Titles	NSW Department of Industry	02/11/2021	02/11/2021	Monthly	1000m	10	10	12
Environmental Planning Instrument SEPP State Significant Precincts	NSW Department of Planning, Industry and Environment	15/11/2021	07/12/2018	Monthly	1000m	0	0	0
Environmental Planning Instrument Land Zoning	NSW Department of Planning, Industry and Environment	15/11/2021	05/11/2021	Monthly	1000m	1	10	98
Commonwealth Heritage List	Australian Government Department of the Agriculture, Water and the Environment	18/05/2021	20/11/2019	Annually	1000m	0	0	0
National Heritage List	Australian Government Department of the Agriculture, Water and the Environment	18/05/2021	20/11/2019	Annually	1000m	0	1	3
State Heritage Register - Curtilages	NSW Department of Planning, Industry and Environment	19/08/2021	25/06/2021	Quarterly	1000m	0	3	20
Environmental Planning Instrument Local Heritage	NSW Department of Planning, Industry and Environment	15/11/2021	05/11/2021	Monthly	1000m	0	25	214
Bush Fire Prone Land	NSW Rural Fire Service	04/01/2022	08/12/2021	Weekly	1000m	0	0	0
Native Vegetation of the Sydney Metropolitan Area	NSW Office of Environment & Heritage	01/03/2017	16/12/2016	As required	1000m	1	2	11
Ramsar Wetlands of Australia	Australian Government Department of Agriculture, Water and the Environment	24/02/2021	19/03/2020	Annually	1000m	0	0	0
Groundwater Dependent Ecosystems	Bureau of Meteorology	14/08/2017	15/05/2017	Annually	1000m	0	0	3
Inflow Dependent Ecosystems Likelihood	Bureau of Meteorology	14/08/2017	15/05/2017	Unknown	1000m	0	0	4
NSW BioNet Species Sightings	NSW Office of Environment & Heritage	04/01/2022	04/01/2022	Weekly	10000m	-	-	-

Site Diagram

9 Albert Street, North Parramatta, NSW 2151



Legend

- Site Boundary
- Internal Parcel Boundaries

Total Area: 8336m²

Total Perimeter: 405m

Disclaimers:

Measurements are approximate only and may have been simplified or smaller lengths removed for readability.

Parcels that make up a small percentage of the total site area have not been labelled for increased legibility.

Scale:

Data Source Aerial Imagery:
© Aerometrex Pty Ltd

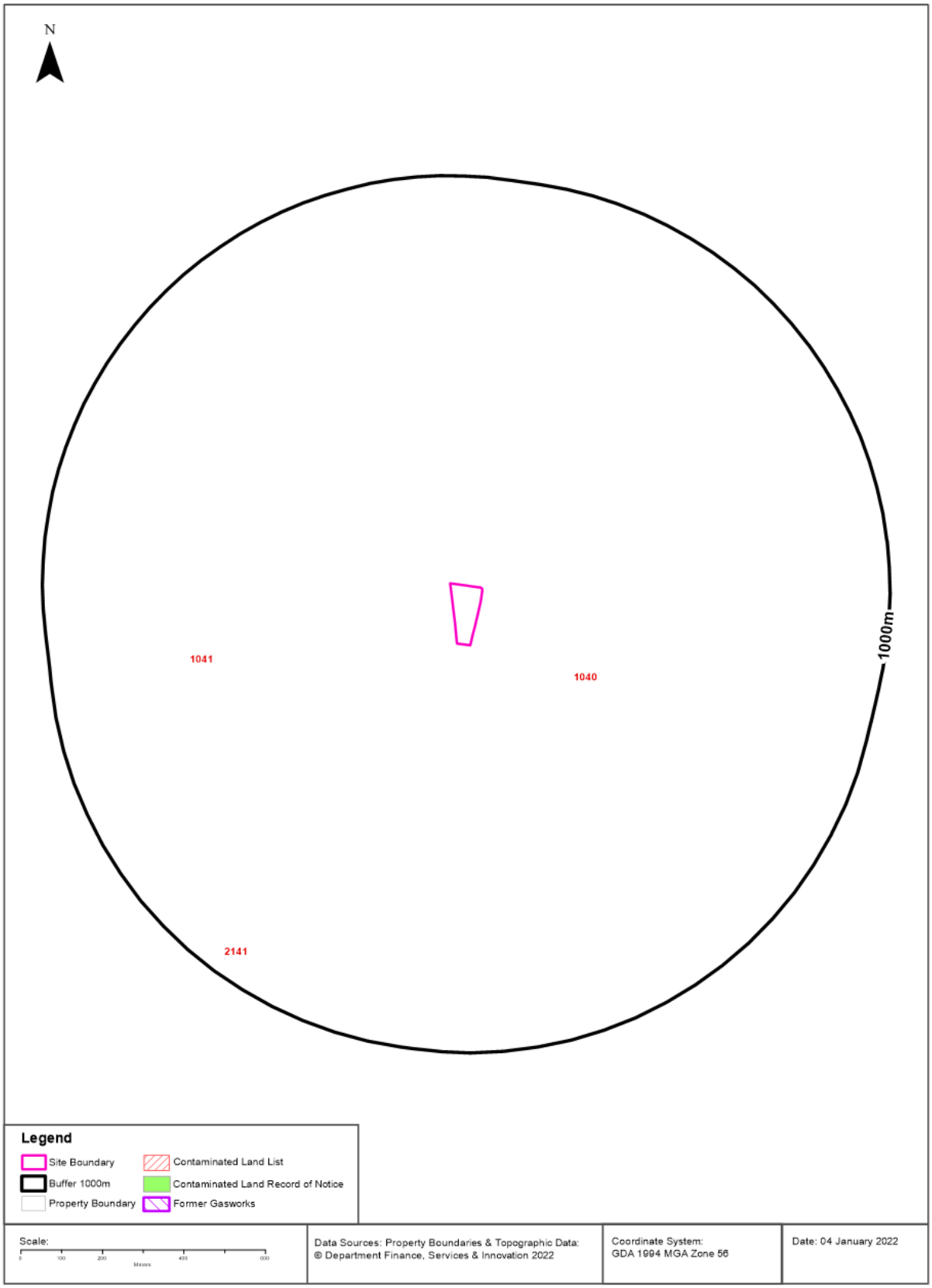
Coordinate System:
GDA 1994 MGA Zone 56

Date: 04 January 2022

Lotsearch Pty Ltd ABN 89 600 168 018

Contaminated Land

9 Albert Street, North Parramatta, NSW 2151



Contaminated Land

9 Albert Street, North Parramatta, NSW 2151

List of NSW contaminated sites notified to EPA

Records from the NSW EPA Contaminated Land list within the dataset buffer:

Map Id	Site	Address	Suburb	Activity	Management Class	Status	Location Confidence	Dist	Direction
1040	BP Service Station	435 Church Street	Parramatta	Service Station	Regulation under CLM Act not required	Current EPA List	Premise Match	258m	South East
1041	Coleman Oval Embankment	Cnr of Pitt Street and Maquarie Street	Parramatta	Unclassified	Regulation under CLM Act not required	Current EPA List	Premise Match	523m	West
2141	Parramatta Park Toilet Block Demolition	The Cresent Toilet Block Parramatta Park	Parramatta	Unclassified	Regulation under CLM Act not required	Current EPA List	Premise Match	848m	South West

The values within the EPA site management class in the table above, are given more detailed explanations in the table below:

EPA site management class	Explanation
Contamination being managed via the planning process (EP&A Act)	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation. The contamination of this site is managed by the consent authority under the Environmental Planning and Assessment Act 1979 (EP&A Act) planning approval process, with EPA involvement as necessary to ensure significant contamination is adequately addressed. The consent authority is typically a local council or the Department of Planning and Environment.
Contamination currently regulated under CLM Act	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the Contaminated Land Management Act 1997 (CLM Act). Management of the contamination is regulated by the EPA under the CLM Act. Regulatory notices are available on the EPA's Contaminated Land Public Record of Notices.
Contamination currently regulated under POEO Act	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation. Management of the contamination is regulated under the Protection of the Environment Operations Act 1997 (POEO Act). The EPA's regulatory actions under the POEO Act are available on the POEO public register.
Contamination formerly regulated under the CLM Act	The EPA has determined that the contamination is no longer significant enough to warrant regulation under the Contaminated Land Management Act 1997 (CLM Act). The contamination was addressed under the CLM Act.
Contamination formerly regulated under the POEO Act	The EPA has determined that the contamination is no longer significant enough to warrant regulation. The contamination was addressed under the Protection of the Environment Operations Act 1997 (POEO Act).
Contamination was addressed via the planning process (EP&A Act)	The EPA has determined that the contamination is no longer significant enough to warrant regulation. The contamination was addressed by the appropriate consent authority via the planning process under the Environmental Planning and Assessment Act 1979 (EP&A Act).
Ongoing maintenance required to manage residual contamination (CLM Act)	The EPA has determined that ongoing maintenance, under the Contaminated Land Management Act 1997 (CLM Act), is required to manage the residual contamination. Regulatory notices under the CLM Act are available on the EPA's Contaminated Land Public Record of Notices.
Regulation being finalised	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the Contaminated Land Management Act 1997. A regulatory approach is being finalised.
Regulation under the CLM Act not required	The EPA has completed an assessment of the contamination and decided that regulation under the Contaminated Land Management Act 1997 is not required.
Under assessment	The contamination is being assessed by the EPA to determine whether regulation is required. The EPA may require further information to complete the assessment. For example, the completion of management actions regulated under the planning process or Protection of the Environment Operations Act 1997. Alternatively, the EPA may require information via a notice issued under s77 of the Contaminated Land Management Act 1997 or issue a Preliminary Investigation Order.

NSW EPA Contaminated Land List Data Source: Environment Protection Authority

© State of New South Wales through the Environment Protection Authority

Contaminated Land

9 Albert Street, North Parramatta, NSW 2151

Contaminated Land: Records of Notice

Record of Notices within the dataset buffer:

Map Id	Name	Address	Suburb	Notices	Area No	Location Confidence	Distance	Direction
N/A	No records in buffer							

Contaminated Land Records of Notice Data Source: Environment Protection Authority
© State of New South Wales through the Environment Protection Authority
Terms of use and disclaimer for Contaminated Land: Record of Notices, please visit
http://www.epa.nsw.gov.au/clm/clmdisclaimer.htm

Former Gasworks

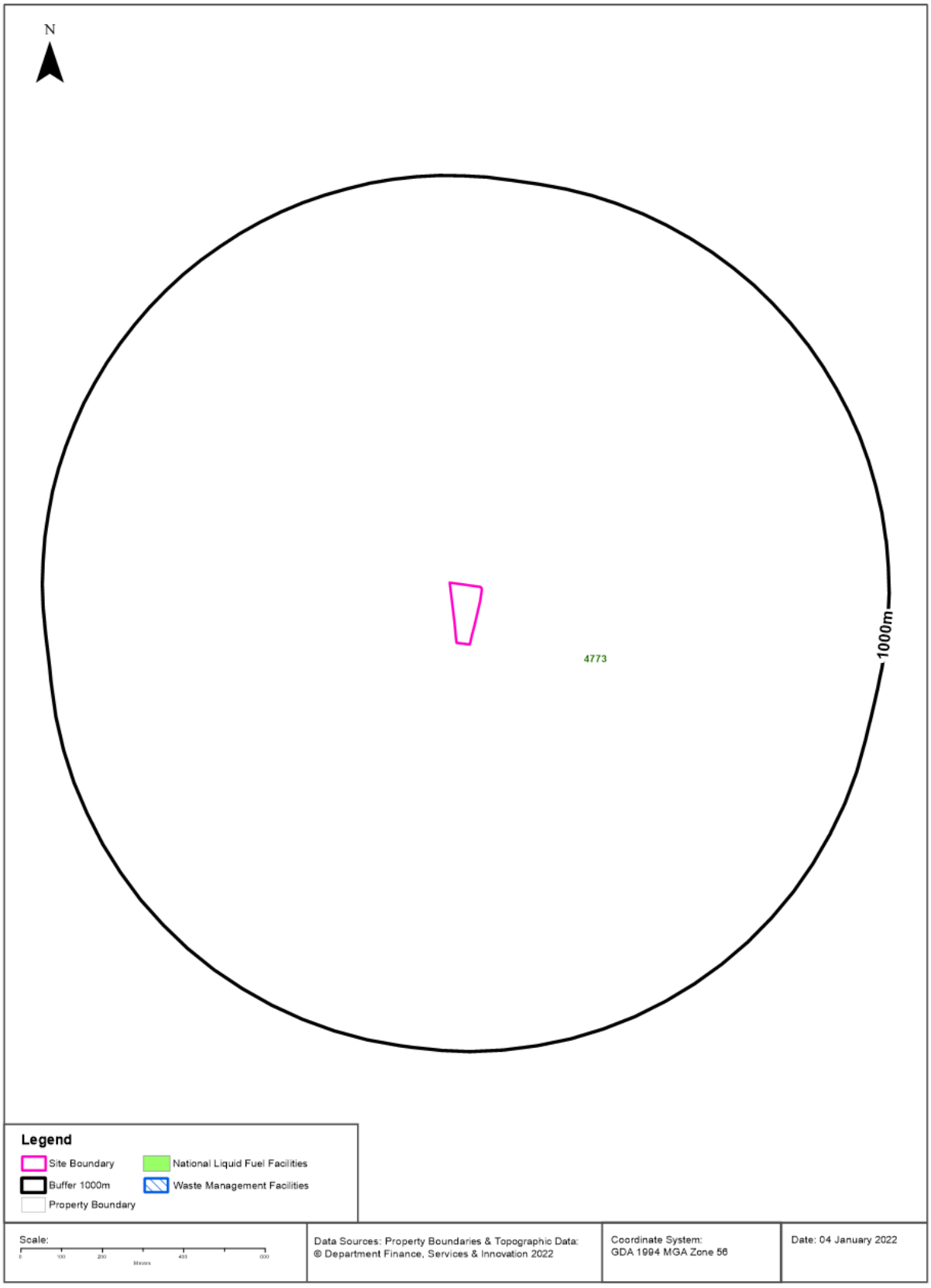
Former Gasworks within the dataset buffer:

Map Id	Location	Council	Further Info	Location Confidence	Distance	Direction
N/A	No records in buffer					

Former Gasworks Data Source: Environment Protection Authority
© State of New South Wales through the Environment Protection Authority

Waste Management & Liquid Fuel Facilities

9 Albert Street, North Parramatta, NSW 2151



Waste Management & Liquid Fuel Facilities

9 Albert Street, North Parramatta, NSW 2151

National Waste Management Site Database

Sites on the National Waste Management Site Database within the dataset buffer:

Site Id	Owner	Name	Address	Suburb	Class	Landfill	Reprocess	Transfer	Comments	Loc Conf	Dist	Direction
N/A	No records in buffer											

Waste Management Facilities Data Source: Geoscience Australia
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National Liquid Fuel Facilities

National Liquid Fuel Facilties within the dataset buffer:

Map Id	Owner	Name	Address	Suburb	Class	Operational Status	Operator	Revision Date	Loc Conf	Dist	Direction
4773	BP	BP Connect Parramatta	433-437 Church Street	Parramatta	Petrol Station	Operational		25/07/2011	Premise Match	258m	South East

National Liquid Fuel Facilities Data Source: Geoscience Australia
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PFAS Investigation & Management Programs

9 Albert Street, North Parramatta, NSW 2151

EPA PFAS Investigation Program

Sites that are part of the EPA PFAS investigation program, within the dataset buffer:

Map ID	Site	Address	Loc Conf	Dist	Dir
N/A	No records in buffer				

EPA PFAS Investigation Program: Environment Protection Authority
© State of New South Wales through the Environment Protection Authority

Defence PFAS Investigation Program

Sites being investigated by the Department of Defence for PFAS contamination within the dataset buffer:

Map ID	Base Name	Address	Loc Conf	Dist	Dir
N/A	No records in buffer				

Defence PFAS Investigation Program Data Custodian: Department of Defence, Australian Government

Defence PFAS Management Program

Sites being managed by the Department of Defence for PFAS contamination within the dataset buffer:

Map ID	Base Name	Address	Loc Conf	Dist	Dir
N/A	No records in buffer				

Defence PFAS Management Program Data Custodian: Department of Defence, Australian Government

Airservices Australia National PFAS Management Program

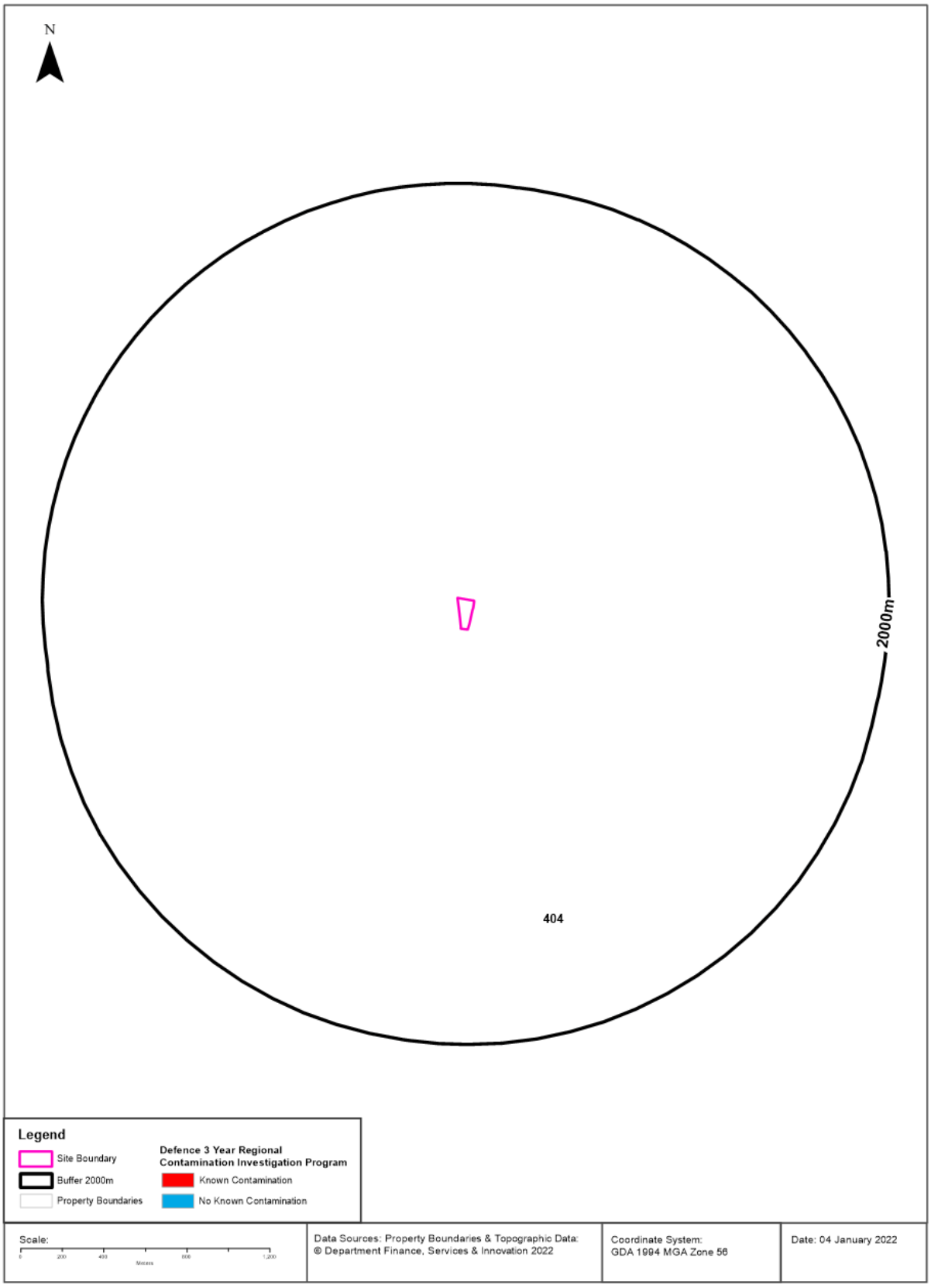
Sites being investigated or managed by Airservices Australia for PFAS contamination within the dataset buffer:

Map ID	Site Name	Impacts	Loc Conf	Dist	Dir
N/A	No records in buffer				

Airservices Australia National PFAS Management Program Data Custodian: Airservices Australia

Defence 3 Year Regional Contamination Investigation Program

9 Albert Street, North Parramatta, NSW 2151



Lotsearch Pty Ltd ABN 89 600 168 018

Defence Sites

9 Albert Street, North Parramatta, NSW 2151

Defence 3 Year Regional Contamination Investigation Program

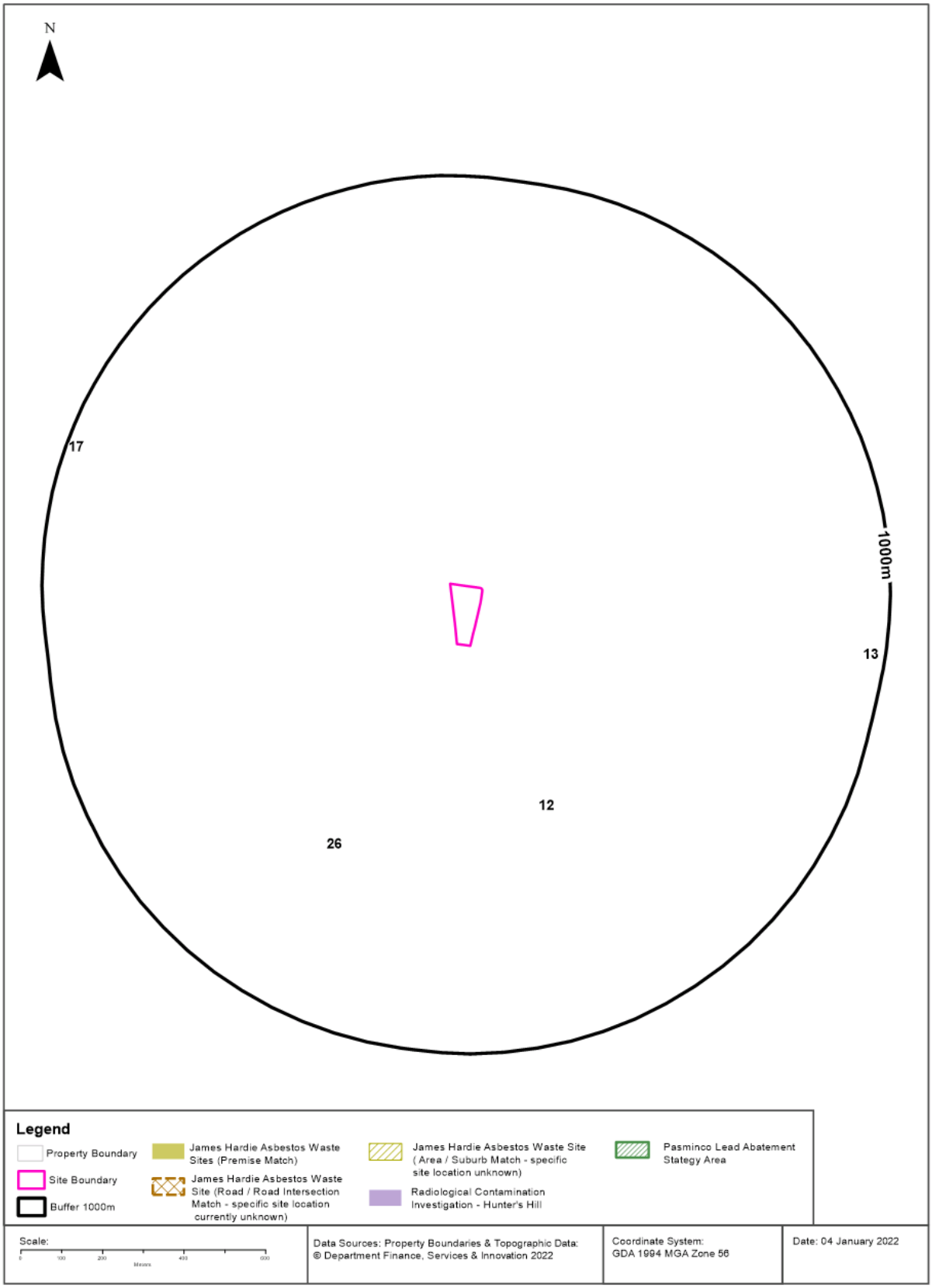
Sites which have been assessed as part of the Defence 3 Year Regional Contamination Investigation Program within the dataset buffer:

Property ID	Base Name	Address	Known Contamination	Loc Conf	Dist	Dir
404	Lancer Barracks - Parramatta	Parramatta, New South Wales	NO	Premise Match	1392m	South

Defence 3 Year Regional Contamination Investigation Program, Data Custodian: Department of Defence, Australian Government

EPA Other Sites with Contamination Issues

9 Albert Street, North Parramatta, NSW 2151



EPA Other Sites with Contamination Issues

9 Albert Street, North Parramatta, NSW 2151

EPA Other Sites with Contamination Issues

This dataset contains other sites identified on the EPA website as having contamination issues. This dataset currently includes:

- James Hardie asbestos manufacturing and waste disposal sites
- Radiological investigation sites in Hunter's Hill
- Pasminco Lead Abatement Strategy Area

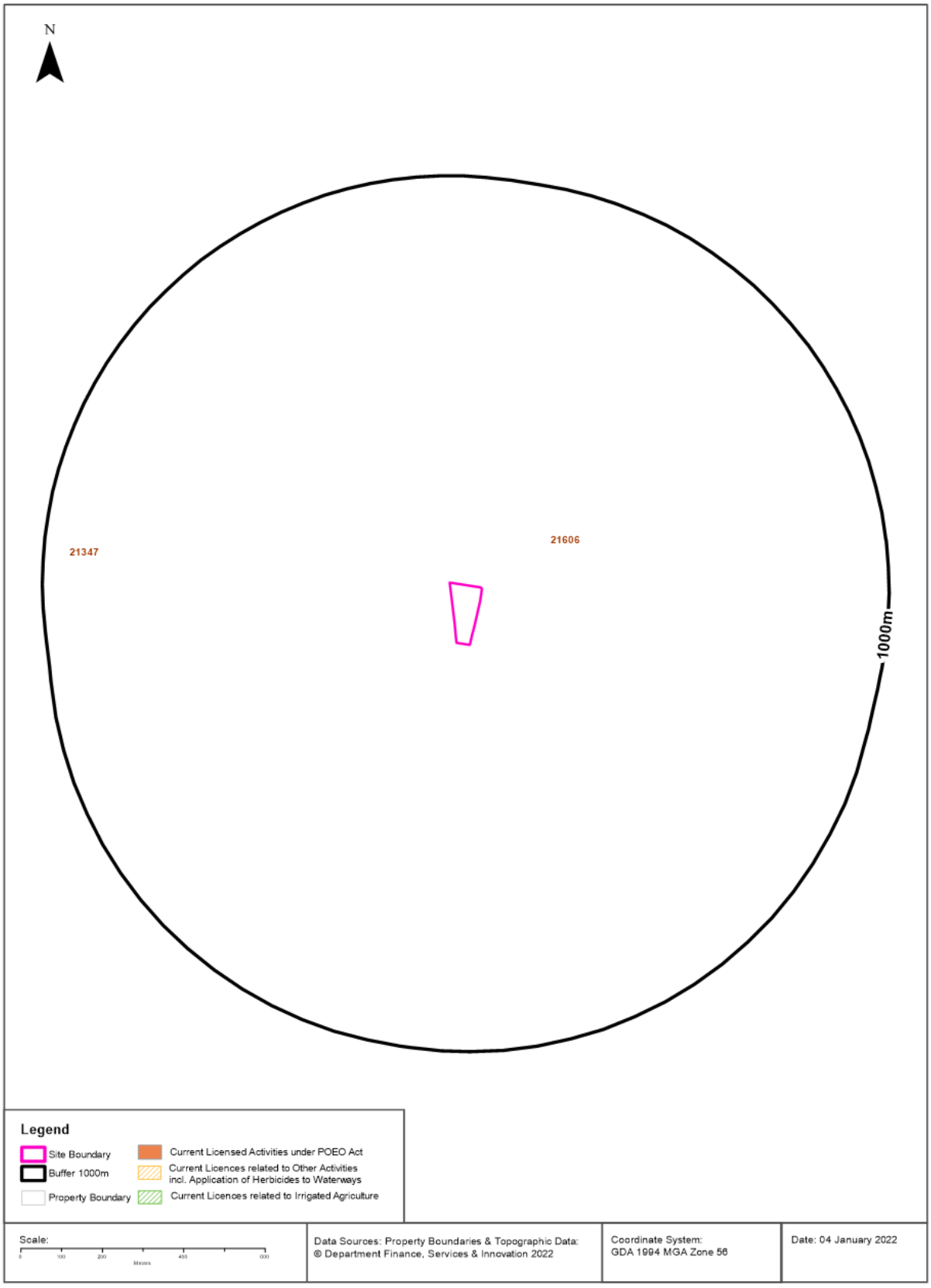
Sites within the dataset buffer:

Site Id	Site Name	Site Address	Dataset	Comments	Location Confidence	Distance	Direction
26	Cumberland Oval	O'Connell Street, Parramatta	James Hardie Asbestos Waste Sites	Current Land Use: Parramatta Stadium Parramatta Pool	Premise Match	292m	South West
12	Catt & Goldsmith Pty Ltd site	Victoria Rd, Parramatta	James Hardie Asbestos Waste Sites	Current Land Use: Commercial site Possibly a timber yard.	Premise Match	371m	South East
13	Doyle Sports Ground	Buller Street Parramatta Fennell Street, Parramatta	James Hardie Asbestos Waste Sites	Current Land Use: Sports oval (well utilised).	Premise Match	937m	East
17	Parramatta showground	Old Windsor Rd, Westmead	James Hardie Asbestos Waste Sites	Current Land Use: Parramatta hospital being constructed on site	Premise Match	950m	North West

EPA Other Sites with Contamination Issues: Environment Protection Authority
© State of New South Wales through the Environment Protection Authority

Current EPA Licensed Activities

9 Albert Street, North Parramatta, NSW 2151



EPA Activities

9 Albert Street, North Parramatta, NSW 2151

Licensed Activities under the POEO Act 1997

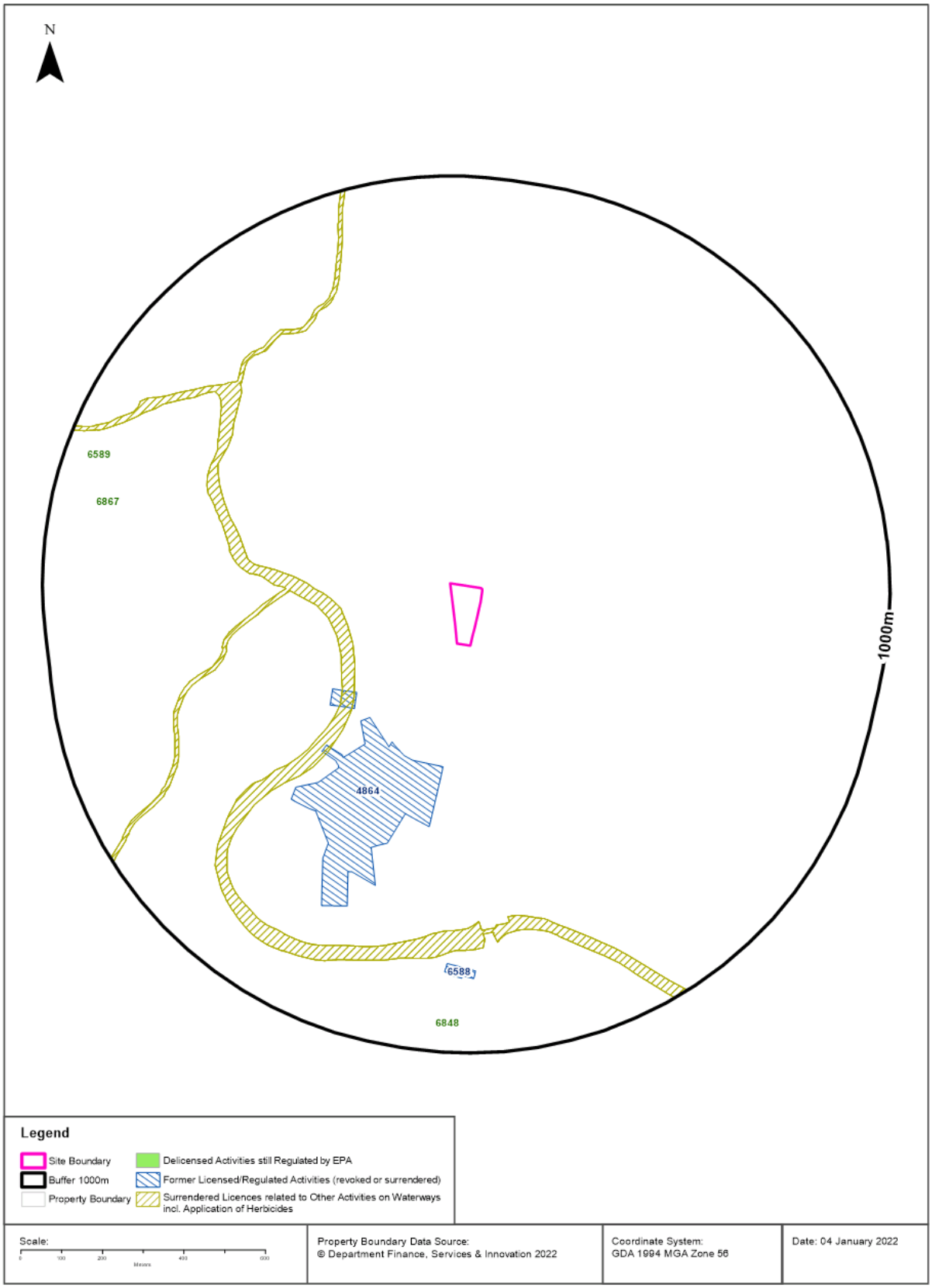
Licensed activities under the Protection of the Environment Operations Act 1997, within the dataset buffer:

EPL	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
21606	GREAT RIVER CITY LIGHT RAIL PTY LTD		PACKAGE 5, PARRAMATTA, NSW 2123		Railway infrastructure construction (<50,000T)	Premise Match	200m	North West
21347	CPB CONTRACTORS PTY LIMITED		PACKAGE 4, PARRAMATTA, NSW 2123		Railway infrastructure construction (>=50,000T & track to be constructed>10k m & <30km)	Network of Features	200m	North West

POEO Licence Data Source: Environment Protection Authority
© State of New South Wales through the Environment Protection Authority

Delicensed & Former Licensed EPA Activities

9 Albert Street, North Parramatta, NSW 2151



EPA Activities

9 Albert Street, North Parramatta, NSW 2151

Delicensed Activities still regulated by the EPA

Delicensed activities still regulated by the EPA, within the dataset buffer:

Licence No	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
6867	THE SYDNEY CHILDREN'S HOSPITALS NETWORK (RANDWICK AND WESTMEAD) (INCORPORATING THE ROYAL ALEXANDRA HOSPITAL FOR CHILDREN)	THE CHILDRENS HOSPITAL AT WESTMEAD	CNR HAWKESBURY ROAD & HAINSWORTH STREET	WESTMEAD	Hazardous, Industrial or Group A Waste Generation or Storage	Premise Match	698m	West
6848	AUSTRALIAN RED CROSS SOCIETY	PARRAMATTA BLOOD SERVICE	4 GEORGE ST	PARRAMATTA	Hazardous, Industrial or Group A Waste Generation or Storage	Premise Match	902m	South
6589	SYDNEY WEST AREA HEALTH SERVICE	WESTMEAD HOSPITAL	CNR HAWKESBURY AND DARCY ROAD	WESTMEAD	Hazardous, Industrial or Group A Waste Generation or Storage	Premise Match	950m	North West

Delicensed Activities Data Source: Environment Protection Authority
© State of New South Wales through the Environment Protection Authority

Former Licensed Activities under the POEO Act 1997, now revoked or surrendered

Former Licensed activities under the Protection of the Environment Operations Act 1997, now revoked or surrendered, within the dataset buffer:

Licence No	Organisation	Location	Status	Issued Date	Activity	Loc Conf	Distance	Direction
4653	LUHRMANN ENVIRONMENT MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW	Surrendered	06/09/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	254m	South West
4838	Robert Orchard	Various Waterways throughout New South Wales - SYDNEY NSW 2000	Surrendered	07/09/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	254m	South West
6630	SYDNEY WEED & PEST MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW - PROSPECT, NSW, 2148	Surrendered	09/11/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	254m	South West
4864	PARRAMATTA STADIUM TRUST	O'CONNELL STREET, PARRAMATTA, NSW 2150	Surrendered	26/06/2000	Miscellaneous licensed discharge to waters (wet weather only)	Premise Match	273m	South West
6588	SYDNEY WEST AREA HEALTH SERVICE	MARSDEN ROAD, PARRAMATTA, NSW 2150	Surrendered	30/03/2000	Hazardous, Industrial or Group A Waste Generation or Storage	Premise Match	783m	South

Former Licensed Activities Data Source: Environment Protection Authority
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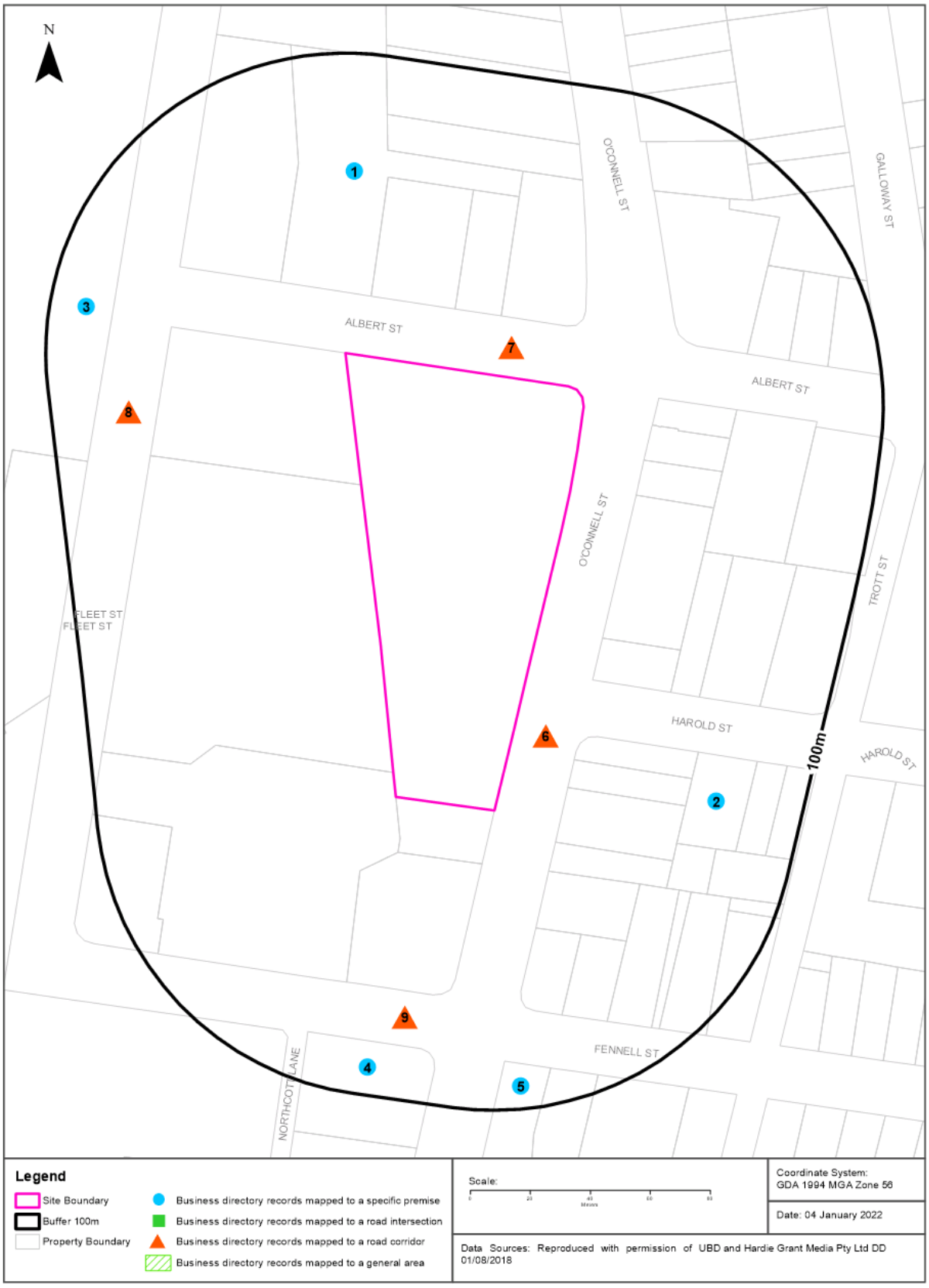
Historical Business Directories

9 Albert Street, North Parramatta, NSW 2151



Historical Business Directories

9 Albert Street, North Parramatta, NSW 2151

Business Directory Records 1950-1991
Premise or Road Intersection Matches

Universal Business Directory records from years 1991, 1986, 1982, 1978, 1975, 1970, 1965, 1961 & 1950, mapped to a premise or road intersection within the dataset buffer:

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
1	MIXED BUSINESSES (M408)	Hospital Store., 4 Albert St., North Parramatta	332891	1970	Premise Match	20m	North
	Mixed Businesses	Hospital Store, 4 Albert St., North Parramatta	117590	1965	Premise Match	20m	North
	Publishers	Quadrant Australian Quarterly Review., 2 Albert St.	137317	1965	Premise Match	20m	North
	GROCERS-RETAIL	Laughton, N. J. & E. J., 4 Albert St., North Parramatta	320769	1961	Premise Match	20m	North
2	TAKE-AWAY FOODS.	Kentucky Fried Chicken Pty. Ltd., 1 Harold St., Parramatta. 2150.	91113	1986	Premise Match	62m	South East
	TAKE-AWAY FOODS. (T0235)	Kentucky Fried Chicken Pty. Ltd., 1 Harold St., Parramatta. 2150.	78526	1982	Premise Match	62m	South East
3	Hospitals - Public	Parramatta Mental Hospital, Fleet St., Parramatta	101117	1965	Premise Match	79m	North West
	MEDICAL PRACTITIONERS	Black, T., Mental Hospital, Parramatta	334582	1961	Premise Match	79m	North West
	MEDICAL PRACTITIONERS	Lisyak, J., Mental Hospital, Parramatta	335688	1961	Premise Match	79m	North West
	HOSPITALS-PUBLIC	Parramatta Mental Hospital., Parramatta	324877	1961	Premise Match	79m	North West
	HOSPITALS-PUBLIC	Parramatta Mental Hospital, Parramatta	62758	1950	Premise Match	79m	North West
4	ARCHITECTS	Neal, E. R., 27 O'Connell St., Parramatta	2316	1950	Premise Match	82m	South
5	Earth-Moving Mach. Hirers	Warnock, M. A., 9 Fennell St., North Parramatta	77033	1965	Premise Match	84m	South

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Business Directory Records 1950-1991
Road or Area Matches

Universal Business Directory records from years 1991, 1986, 1982, 1978, 1975, 1970, 1965, 1961 & 1950, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
6	REAL ESTATE AGENTS &/OR VALUERS.	Bawden, H. T. Pty. Ltd., 3 O'Connell St., Parramatta. 2150	61387	1978	Road Match	0m
	ADVERTISING AGENCIES.	Young, Herbert, Advertising Pty. Ltd., 4 O'Connell St., Parramatta. 2150	1447	1978	Road Match	0m
	SANDWICH &/OR LUNCHEON SHOPS.	Park Gates Sandwich Shop., O'Connell St., Parramatta. 2150	75427	1975	Road Match	0m
	CLUBS & SPORTING BODIES (C487)	Parramatta War Memorial Club, City of, R. S. S., Cnr Parramatta & O'Connell Sts., Parramatta	284547	1970	Road Match	0m
	SCHOOLS/COLLEGES-PRIVATE/PUBLIC	King's Preparatory School, O'Connell St., Parramatta	248316	1961	Road Match	0m
7	MIXED BUSINESSES & GENERAL STORES	Burgess, Mrs. A. J., Albert St., North Parramatta	79494	1950	Road Match	0m
	FARRIERS	Eaton, A., Albert St., Parramatta North	43550	1950	Road Match	0m
8	MEDICAL PRACTITIONERS (M216)	Maddison, D. C., 3 Fleet St., Parramatta	327536	1970	Road Match	59m
	Medical Practitioners	Maddison, D. C., 3 Fleet St., Parramatta	112117	1965	Road Match	59m
	MEDICAL PRACTITIONERS	Maddison, D. C., 3 Fleet St., Parramatta	335749	1961	Road Match	59m
9	Air Conditioning Sales &/or Service	Harvey Air Conditioning Pty. Ltd., Fennell St., Parramatta 2150	34010	1991	Road Match	63m
	TILERS - ROOF &/OR SLATERS.	Sydney Slate Centre, Fennell St., Parramatta. 2150	93422	1986	Road Match	63m
	TILERS - ROOF &/OR SLATERS.(T4375)	Sydney Slate Centre, Fennell St., Parramatta. 2150.	80201	1982	Road Match	63m
	Printers' Ink Mfrs./Import.	Read Industries Pty. Ltd., Fennell St., Parramatta	135873	1965	Road Match	63m

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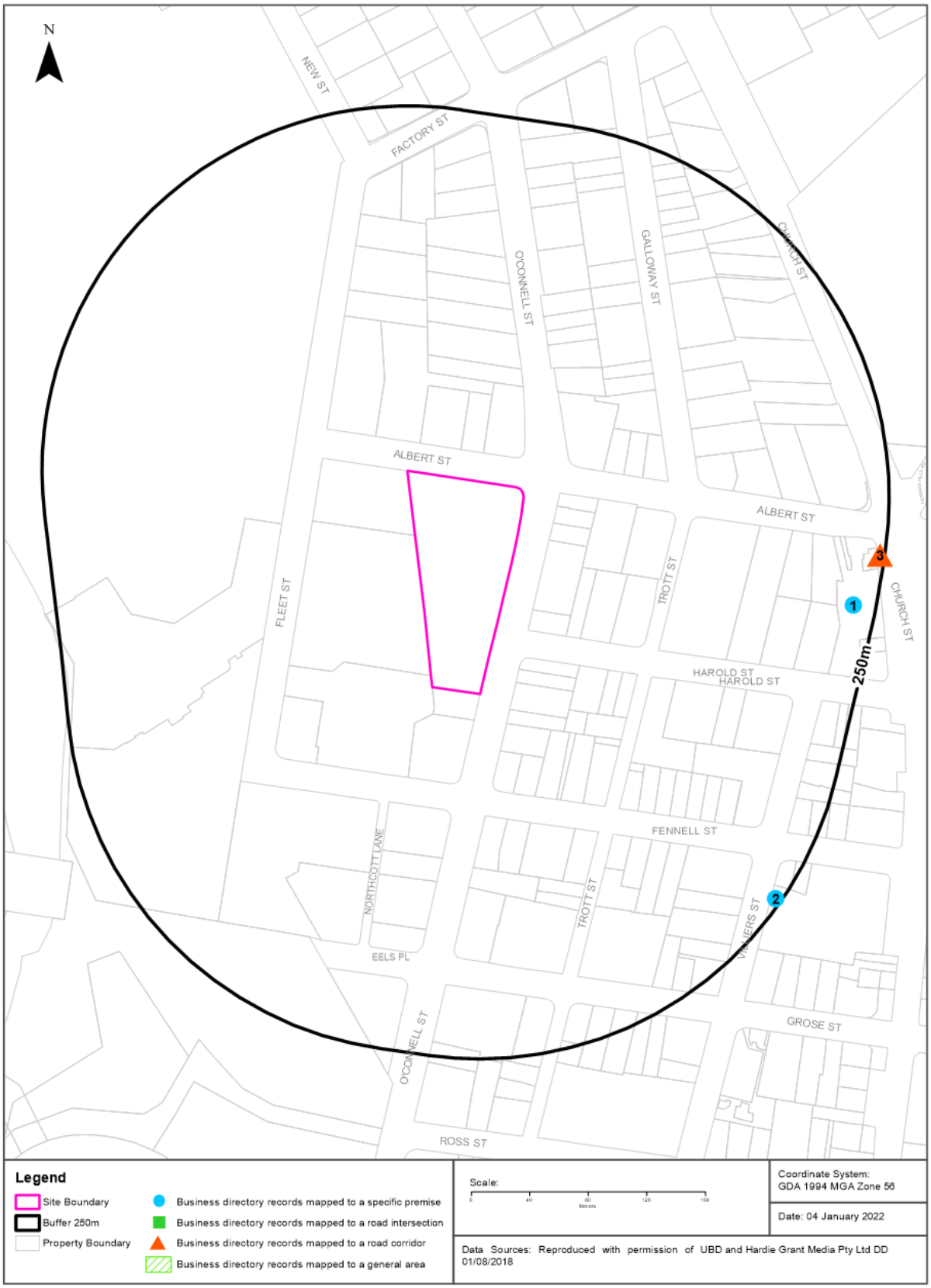
Dry Cleaners, Motor Garages & Service Stations

9 Albert Street, North Parramatta, NSW 2151



Historical Business Directories

9 Albert Street, North Parramatta, NSW 2151

Dry Cleaners, Motor Garages & Service Stations 1948-1993 Premise or Road Intersection Matches

Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories, mapped to a premise or road intersection, within the dataset buffer.

Note: The Universal Business Directories were published between 1948 and 1993. Dry Cleaners, Motor Garages & Service Stations have been extracted from all of these directories except the following years 1951, 1955, 1957, 1960, 1963, 1973, 1974, 1977, 1987.

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
1	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Campbell R. (Caltex)., 451 Church St., Parramatta. 2150.	41219	1979	Premise Match	213m	East
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Campbell, R., (Caltex), 451 Church St., Parramatta. 2150	49750	1978	Premise Match	213m	East
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Campbell R., 451 Church St., Parramatta 2150	29678	1976	Premise Match	213m	East
	MOTOR GARAGES &/OR ENGINEERS.	Campbell, R., 451 Church St., Parramatta. 2150	58624	1975	Premise Match	213m	East
	MOTOR GARAGES & ENGINEERS(M6S6)	Campbell, R., 451 Church St., PARRAMATTA	337517	1970	Premise Match	213m	East
	MOTOR GARAGES & ENGINEERS.	Campbell R., 451 Church St Parramatta	42738	1969	Premise Match	213m	East
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Campbell Ron (Caltex)., 451 Church St Parramatta	50589	1969	Premise Match	213m	East
	MOTOR GARAGES & ENGINEERS	Campbell R., 451 Church St Parramatta	26288	1968	Premise Match	213m	East
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Campbell Ron (Caltex)., 451 Church St., Parramatta	32615	1968	Premise Match	213m	East
	MOTOR GARAGES & ENGINEERS.	Campbell R., 451 Church St Parramatta	10784	1967	Premise Match	213m	East
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Campbell Ron (Caltex)., 451 Church St., Parramatta	16080	1967	Premise Match	213m	East
	MOTOR GARAGES & ENGINEERS.	Campbell R., 451 Church St Parramatta	60522	1966	Premise Match	213m	East
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Campbell Ron (Caltex)., 451 Church St Parramatta	1648	1966	Premise Match	213m	East
	MOTOR GARAGES & ENGINEERS	Campbell R., 451 Church St Parramatta	48447	1964	Premise Match	213m	East
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Campbell Ron (Caltex)., 451 Church St Parramatta	52270	1964	Premise Match	213m	East
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Campbell Ron (Caitex)., 451 Church St Parramatta	38527	1962	Premise Match	213m	East
2	Motor Service Stations - Petrol, Oil, Etc.	Town & Country Garage Pty. Ltd., 425 Church St. Parramatta	126024	1965	Premise Match	240m	South East
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Town & Country Garage Pty. Ltd., 425 Church St Parramatta	52287	1964	Premise Match	240m	South East

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
2	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Town & Country Garage Pty. Ltd., 425 Church St Parramatta	38545	1962	Premise Match	240m	South East
	MOTOR SERVICE STATIONS—PETROL, OIL, Etc.	Town & Country Garage Pty. Ltd., 425 Church St. PARRAMATTA	351227	1961	Premise Match	240m	South East
	MOTOR SERVICE STATIONS-PETROL,. OIL, ETC.	Town & Country Garage Pty. Ltd., 425 Church St Parramatta	24455	1959	Premise Match	240m	South East
	MOTOR SERVICE STATIONS-PETROL, ETC.	Town & Country Garage Pty. Ltd., 425 Church St Parramatta	9884	1958	Premise Match	240m	South East
	MOTOR SERVICE STATIONS-PETROL, ETC.	Town & Country Garage Pty. Ltd., 425 Church St Parramatta	83	1956	Premise Match	240m	South East
	MOTOR SERVICE STATIONS-PETROL, ETC.	Town & Country Garage Pty. Ltd., 425 Church St Parramatta	54707	1954	Premise Match	240m	South East
	MOTOR SERVICE STATIONS–PETROL, ETC.	H. & B. Service Station (F.S. Barker, Propr)., 425 Church St., Parramatta	44078	1953	Premise Match	240m	South East
	MOTOR SERVICE STATIONS-PETROL, Etc.	H. and B. Service Station (F. S. Barker, Propr.), 425 Church St., Parramatta	86025	1950	Premise Match	240m	South East

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Dry Cleaners, Motor Garages & Service Stations 1948-1993 Road or Area Matches

Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published.

Note: The Universal Business Directories were published between 1948 and 1993. Dry Cleaners, Motor Garages & Service Stations have been extracted from all of these directories except the following years 1951, 1955, 1957, 1960, 1963, 1973, 1974, 1977, 1987.

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
3	MOTOR GARAGES & ENGINEERS.	Sayers F., Church St Parramatta	42768	1969	Road Match	240m
	MOTOR GARAGES & ENGINEERS	Sayers F., Church St Parramatta	26316	1968	Road Match	240m
	MOTOR GARAGES & ENGINEERS.	Sayers F., Church St Parramatta	10812	1967	Road Match	240m
	MOTOR GARAGES & ENGINEERS	Fair Deal Car Sales (Parramatta), Church St. Parramatta	347120	1961	Road Match	240m
	MOTOR SERVICE STATIONS—PETROL, OIL, Etc.	Fair Deal Car Sales (Parramatta), Church St. Parramatta	350571	1961	Road Match	240m

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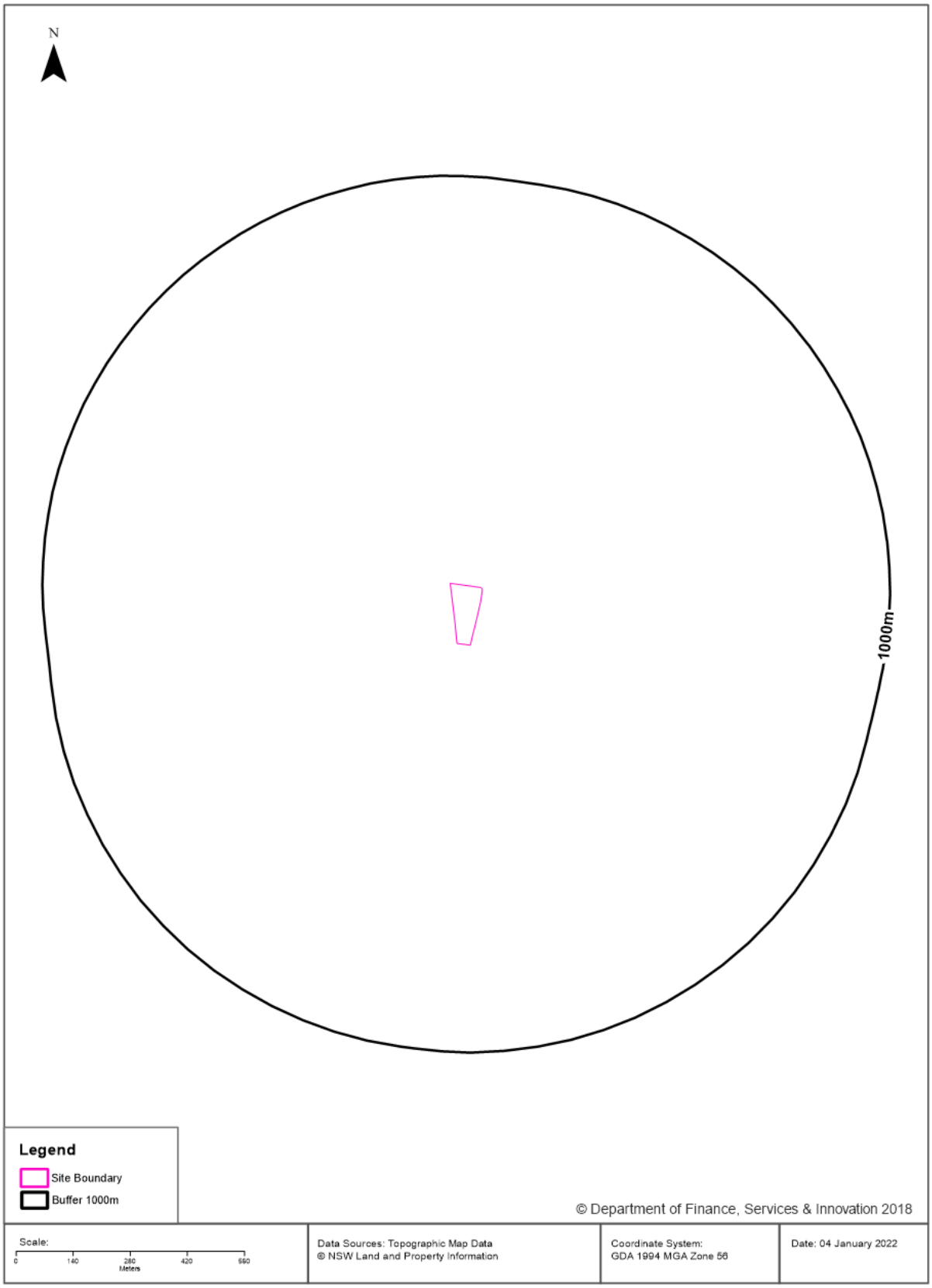
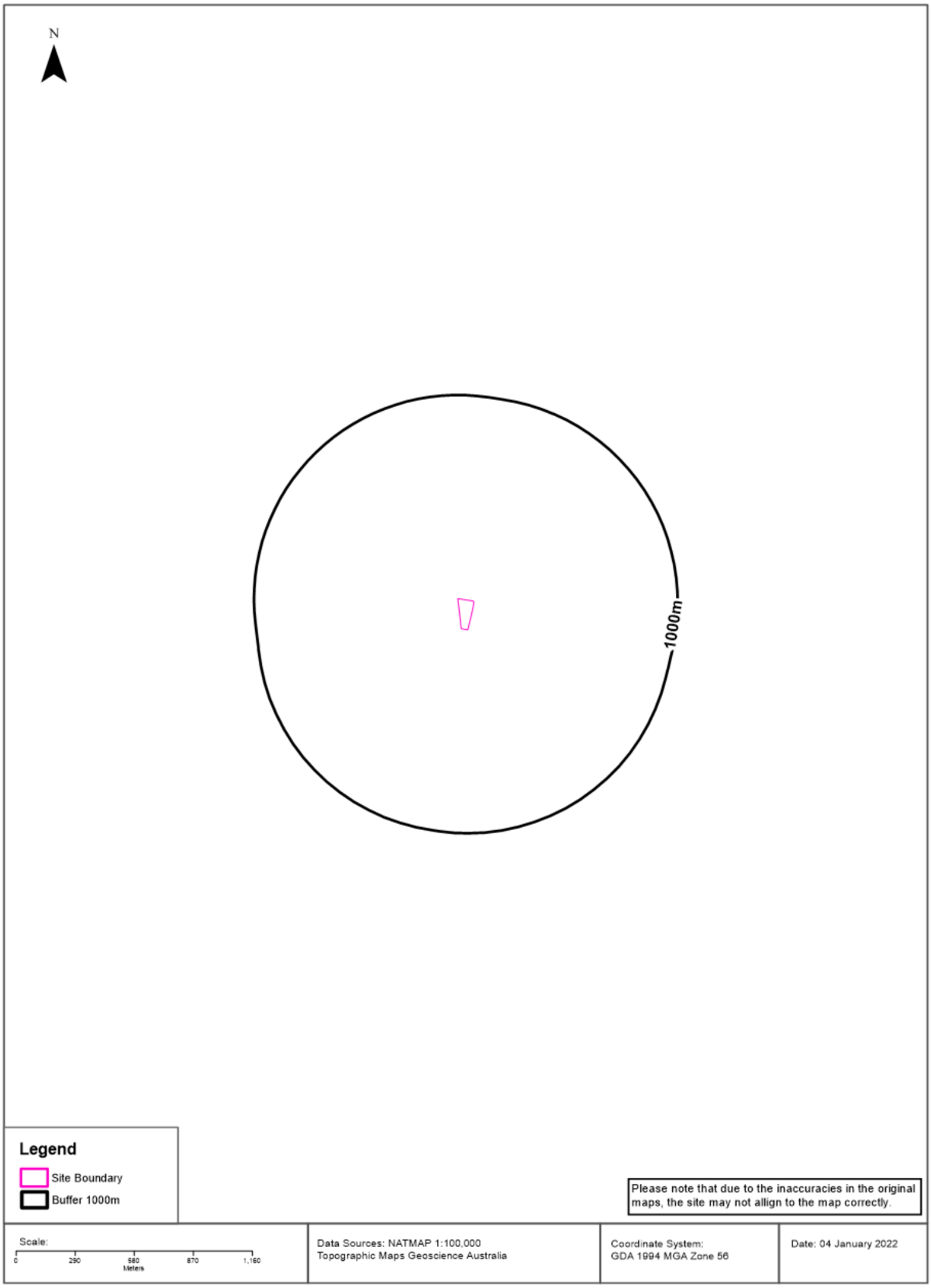
Topographic Map 2015

9 Albert Street, North Parramatta, NSW 2151



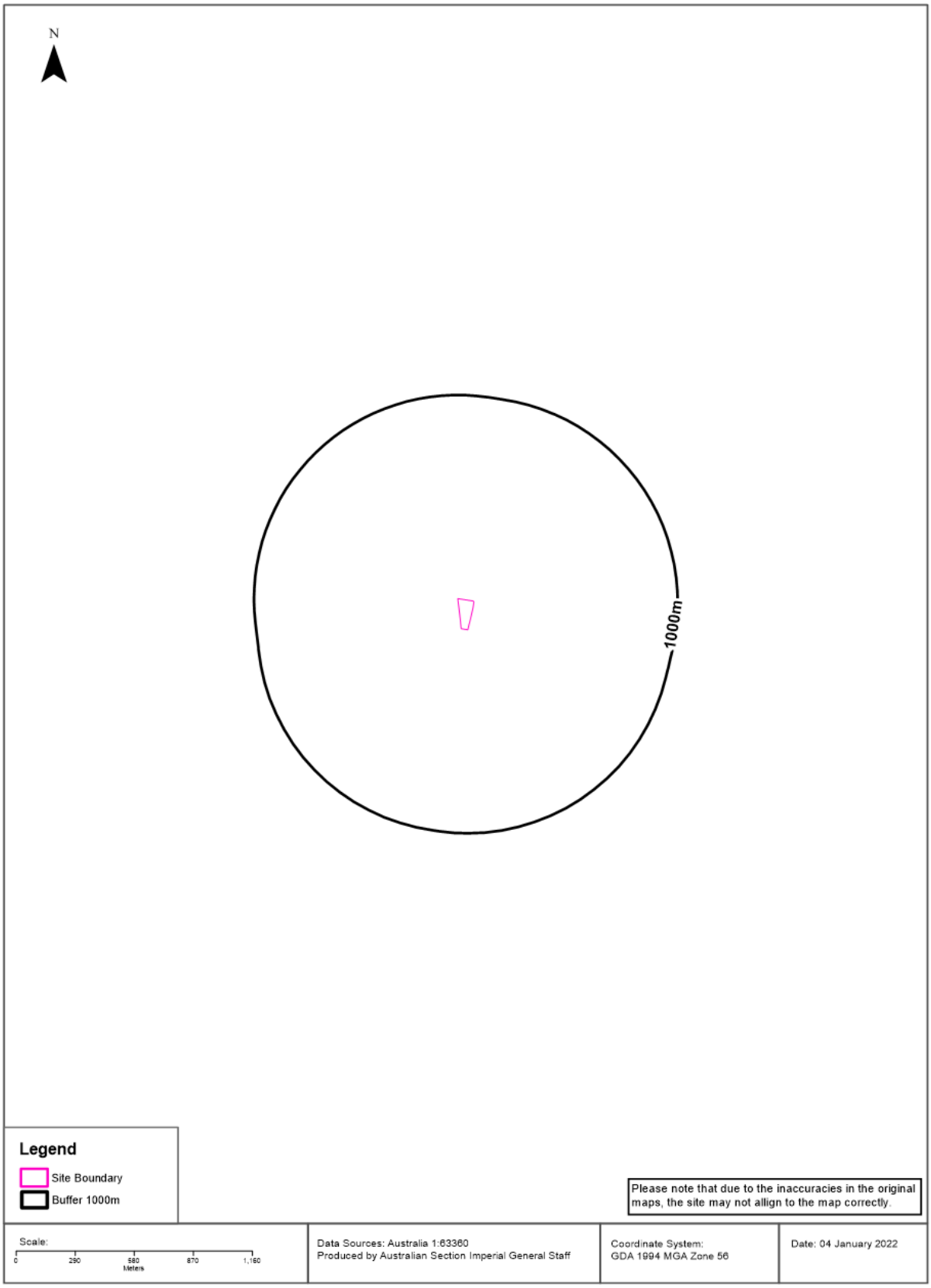
Historical Map 1975

9 Albert Street, North Parramatta, NSW 2151



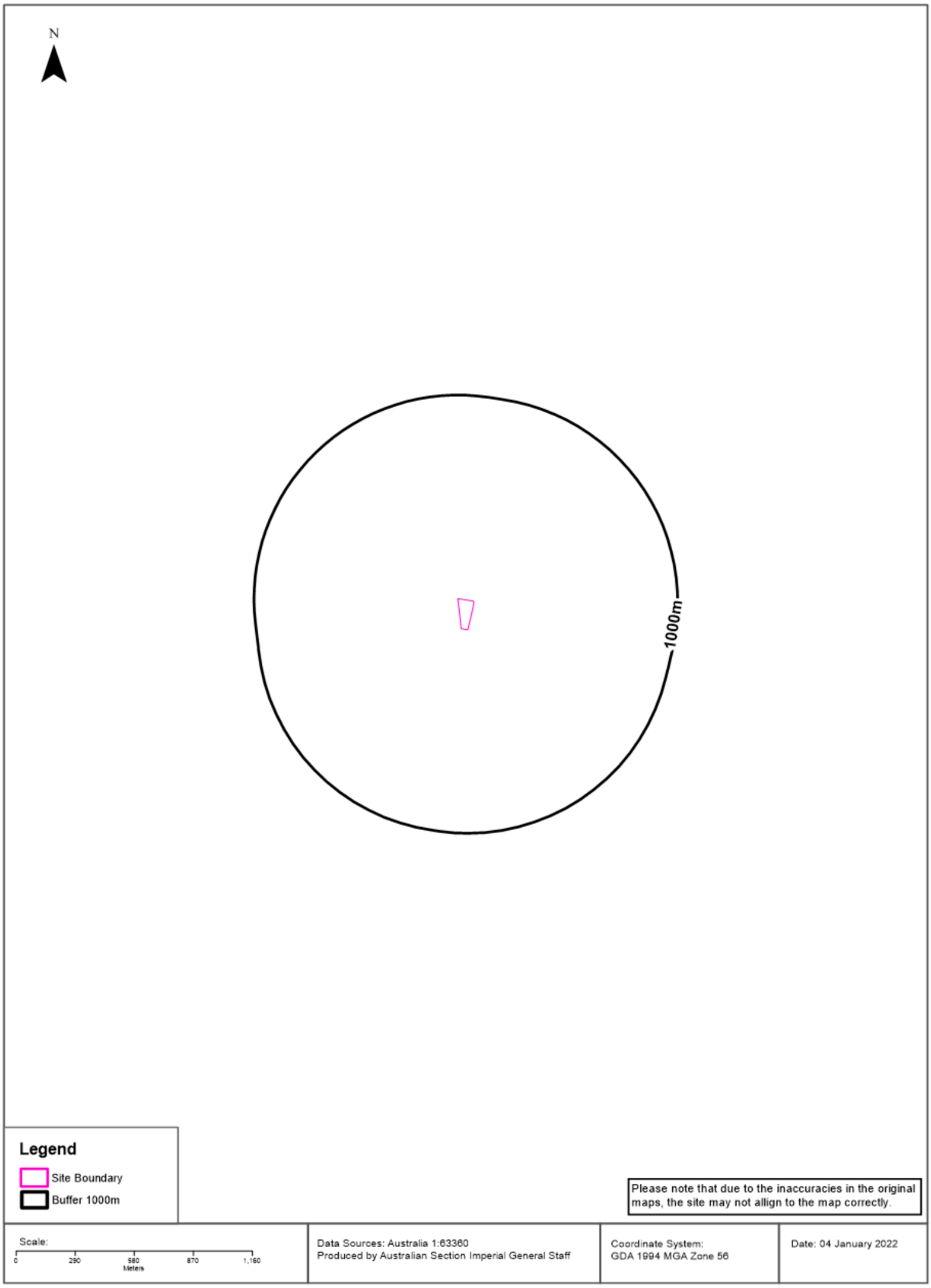
Historical Map 1936 - 1942

9 Albert Street, North Parramatta, NSW 2151



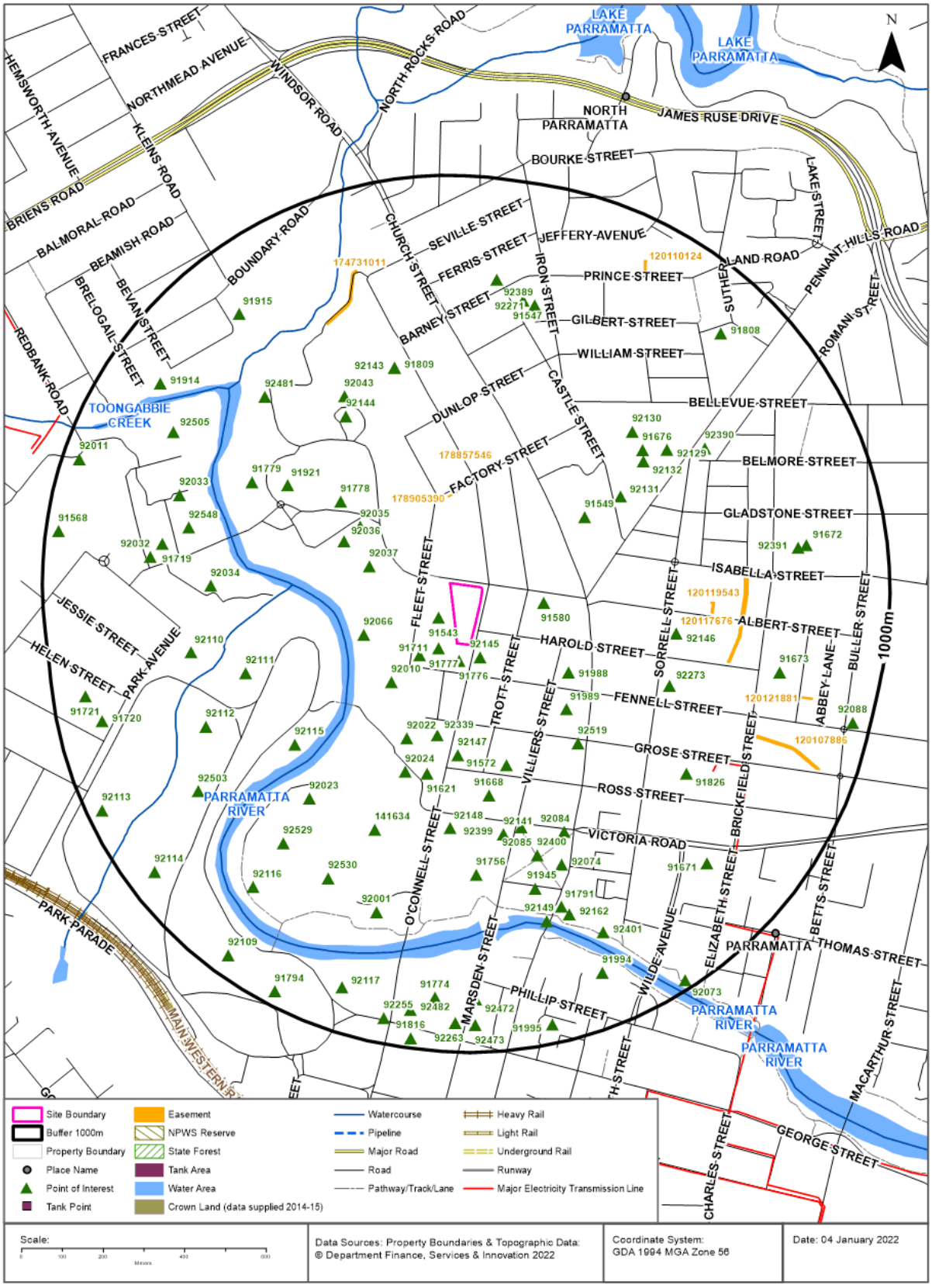
Historical Map 1917 - 1929

9 Albert Street, North Parramatta, NSW 2151



Topographic Features

9 Albert Street, North Parramatta, NSW 2151



Topographic Features

9 Albert Street, North Parramatta, NSW 2151

Points of Interest

What Points of Interest exist within the dataset buffer?

Map Id	Feature Type	Label	Distance	Direction
91543	Nursing Home	SOUTHERN CROSS CARE MARIAN NURSING HOME	37m	West
92145	Historic Site	AVONDALE	41m	South
91776	Community Medical Centre	PARRAMATTA MH EATING DISORDERS COMMUNITY CENTRE	44m	South
91711	Nursing Home	UNITING LILLIAN WELLS NORTH PARRAMATTA	46m	South West
91777	Community Medical Centre	NORTH PARRAMATTA PREVENTION EARLY INTERVENTION AND	96m	South West
91580	Primary School	PARRAMATTA NORTH PUBLIC SCHOOL	155m	East
92010	Parking Area	Parking Area	187m	South West
92037	Parking Area	Parking Area	200m	North West
92066	Swimming Pool Facility	Swimming Pool Facility	225m	West
92339	Club	PARRAMATTA LEAGUES CLUB	233m	South
91988	Parking Area	Parking Area	252m	South East
92035	Parking Area	Parking Area	257m	North West
92022	Parking Area	Parking Area	265m	South West
92147	Historic Site	ROSENEATH COTTAGE	274m	South
92036	Parking Area	Parking Area	277m	North West
91989	Parking Area	Parking Area	286m	South East
91549	Historic Site	SAINT PATRICKS CEMETERY	307m	North East
91572	Primary School	ST PATRICK'S PRIMARY SCHOOL	310m	South
91621	Park	PARRAMATTA PARK	330m	South
91778	Community Medical Centre	NORTH PARRAMATTA BRIDGEWAY COMMUNITY CENTRE	332m	North West
92024	Parking Area	Parking Area	342m	South
92519	Post Office	NORTH PARRAMATTA POST OFFICE	360m	South East
91668	High School	OUR LADY OF MERCY COLLEGE PARRAMATTA	375m	South
92131	Park	PLAYGROUND	408m	North East
92148	Historic Site	MARSDEN REHABILITATION CENTRE GROUP	453m	South
91921	Psychiatric Hospital	CUMBERLAND HOSPITAL	463m	North West
92085	Monument	MATHEW ANDERSON MEMORIAL FOUNTAIN	466m	South
92115	Park	LITTLE COOGEE	469m	South West
92141	Historic Site	ST PATRICKS CATHEDRAL	474m	South
92399	Place Of Worship	ST PATRICKS ROMAN CATHOLIC CATHEDRAL	474m	South
92144	Historic Site	ODDFELLOWS ARMS INN	480m	North West

Map Id	Feature Type	Label	Distance	Direction
92146	Historic Site	ENDRIM	488m	East
92273	Place Of Worship	CENTENARY UNITING CHURCH PARRAMATTA	499m	East
141634	Sports Field	PARRAMATTA STADIUM	502m	South
92132	Sports Field	RICHIE BENAUD OVAL	504m	North East
92084	Historic Site	BILLS HORSE TROUGH PRINCE ALFRED SQUARE	516m	South East
91676	Park	BELMORE PARK	520m	North East
92111	Picnic Area	THE PICNIC GROUND	522m	West
92043	Swimming Pool Facility	Swimming Pool Facility	524m	North West
92023	Parking Area	Parking Area	526m	South West
92130	Sports Field	FOOTBALL	532m	North East
91809	Gaol	PARRAMATTA TRANSITIONAL CENTRE	543m	North
92143	Historic Site	PARRAMATTA CORRECTIONAL CENTRE	543m	North
91779	Community Medical Centre	CUMBERLAND HOSPITAL TRANSCULTURAL MH CENTRE	543m	North West
92400	Park	PRINCE ALFRED SQUARE	544m	South
91756	Primary School	BAYANAMI PUBLIC SCHOOL	566m	South
92129	Sports Court	CRICKET NETS	567m	North East
92034	Parking Area	Parking Area	586m	West
92074	Monument	PARRAMATTA WAR MEMORIAL	586m	South
91826	Park	ROSSLYN BLAY PARK	619m	South East
91945	Community Facility	PARRAMATTA RIVER THEATRES	621m	South
92481	SES Facility	PARRAMATTA SES	642m	North West
92390	Park	THOMAS WILLIAMS RESERVE	646m	North East
92112	Sports Field	SALTERS FIELD	648m	South West
92529	Sports Field	OLD KINGS OVAL	650m	South West
92110	Sports Field	COLEMAN OVAL	651m	West
92548	Psychiatric Hospital	CUMBERLAND HOSPITAL	653m	West
92530	Sports Field	GOVERNMENT FARM	659m	South West
91791	Tourist Information Centre	PARRAMATTA HERITAGE AND VISITOR INFORMATION CENTRE	682m	South
92001	Parking Area	Parking Area	691m	South
92033	Parking Area	Parking Area	696m	West
92271	Place Of Worship	NORTH PARRAMATTA GOSPEL CHAPEL	704m	North
92149	Historic Site	LENNOX BRIDGE	705m	South
92162	Library	LOCAL STUDIES FAMILY HISTORY LIBRARY	706m	South
91719	Nursing Home	WESTMEAD AGED COMMUNITY BASED TRANSITIONAL AGED CARE PROGRAM	710m	West
91547	Park	MARIA LOCK PARK	710m	North
92503	Park	PARRAMATTA PARK	731m	South West
92032	Parking Area	Parking Area	736m	West

Map Id	Feature Type	Label	Distance	Direction
92389	Place Of Worship	PARRAMATTA CHRISTIAN CHURCH	751m	North
91673	Historic Site	ALL SAINTS CEMETERY	756m	East
92505	Park	Park	771m	North West
92401	Park	Park	779m	South East
92116	Park	Park	781m	South West
92391	Sports Court	NETBALL COURTS	782m	East
91671	Place Of Worship	ALL SAINTS ANGLICAN CHURCH	793m	South East
91672	Park	SHERWIN PARK	803m	East
91915	Park	BURLINGTON MEMORIAL PARK	836m	North West
91808	Community Home	NORTHCOURT NURSING HOME	856m	North East
91914	Park	HOSPITAL FARM RESERVE	860m	North West
91994	Parking Area	Parking Area	869m	South
91774	Community Medical Centre	PARRAMATTA COMMUNITY HEALTH CENTRE	871m	South
92472	Police Station	PARRAMATTA POLICE STATION	872m	South
91720	Nursing Home	UNITING WESTMEAD	890m	West
92117	Park	PAVILLION FLAT	892m	South
92482	Court House	PARRAMATTA CHILDRENS COURT	909m	South
91721	Retirement Village	UNITING WESTMEAD VILLIAGE	919m	West
92114	Park	CATTLE PADDOCK	930m	South West
92263	Museum	BRISLINGTON MEDICAL AND NURSING MUSEUM	930m	South
92473	Court House	PARRAMATTA COURT HOUSE	934m	South
92255	Historic Site	TUDOR GATEHOUSE	939m	South
92109	Park	THE CRESCENT	950m	South West
91995	Parking Area	Parking Area	955m	South
92011	Parking Area	Parking Area	957m	West
92088	Picnic Area	PLAYGROUND	959m	East
92113	Park	WEST DOMAIN	962m	South West
91794	Museum	OLD GOVERNMENT HOUSE	966m	South West
91568	Special School	THE CHILDRENS HOSPITAL SCHOOL	968m	West
91816	Court House	FEDERAL CIRCUIT COURT OF AUSTRALIA NSW	978m	South
92073	Park	CDB RIVER FORESHORE	979m	South East

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Topographic Features

9 Albert Street, North Parramatta, NSW 2151

Tanks (Areas)

What are the Tank Areas located within the dataset buffer?
Note. The large majority of tank features provided by LPI are derived from aerial imagery & are therefore primarily above ground tanks.

Map Id	Tank Type	Status	Name	Feature Currency	Distance	Direction
N/A	No records in buffer					

Tanks (Points)

What are the Tank Points located within the dataset buffer?
Note. The large majority of tank features provided by LPI are derived from aerial imagery & are therefore primarily above ground tanks.

Map Id	Tank Type	Status	Name	Feature Currency	Distance	Direction
N/A	No records in buffer					

Tanks Data Source: © Land and Property Information (2015)
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Major Easements

What Major Easements exist within the dataset buffer?
Note. Easements provided by LPI are not at the detail of local governments. They are limited to major easements such as Right of Carriageway, Electrical Lines (66kVa etc.), Easement to drain water & Significant subterranean pipelines (gas, water etc.).

Map Id	Easement Class	Easement Type	Easement Width	Distance	Direction
178905390	Primary	Right of way	Variable	212m	North
178857546	Primary	Right of way	Var	300m	North
120117676	Primary	Undefined		562m	East
120119543	Primary	Undefined		624m	East
174731011	Primary	Right of way		701m	North
120107886	Primary	Undefined		729m	South East
120121881	Primary	Undefined		822m	East
120110124	Primary	Undefined		872m	North East

Easements Data Source: © Land and Property Information (2015)
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Topographic Features

9 Albert Street, North Parramatta, NSW 2151

State Forest

What State Forest exist within the dataset buffer?

State Forest Number	State Forest Name	Distance	Direction
N/A	No records in buffer		

State Forest Data Source: © NSW Department of Finance, Services & Innovation (2018)
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National Parks and Wildlife Service Reserves

What NPWS Reserves exist within the dataset buffer?

Reserve Number	Reserve Type	Reserve Name	Gazetted Date	Distance	Direction
N/A	No records in buffer				

NPWS Data Source: © NSW Department of Finance, Services & Innovation (2018)
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Elevation Contours (m AHD)

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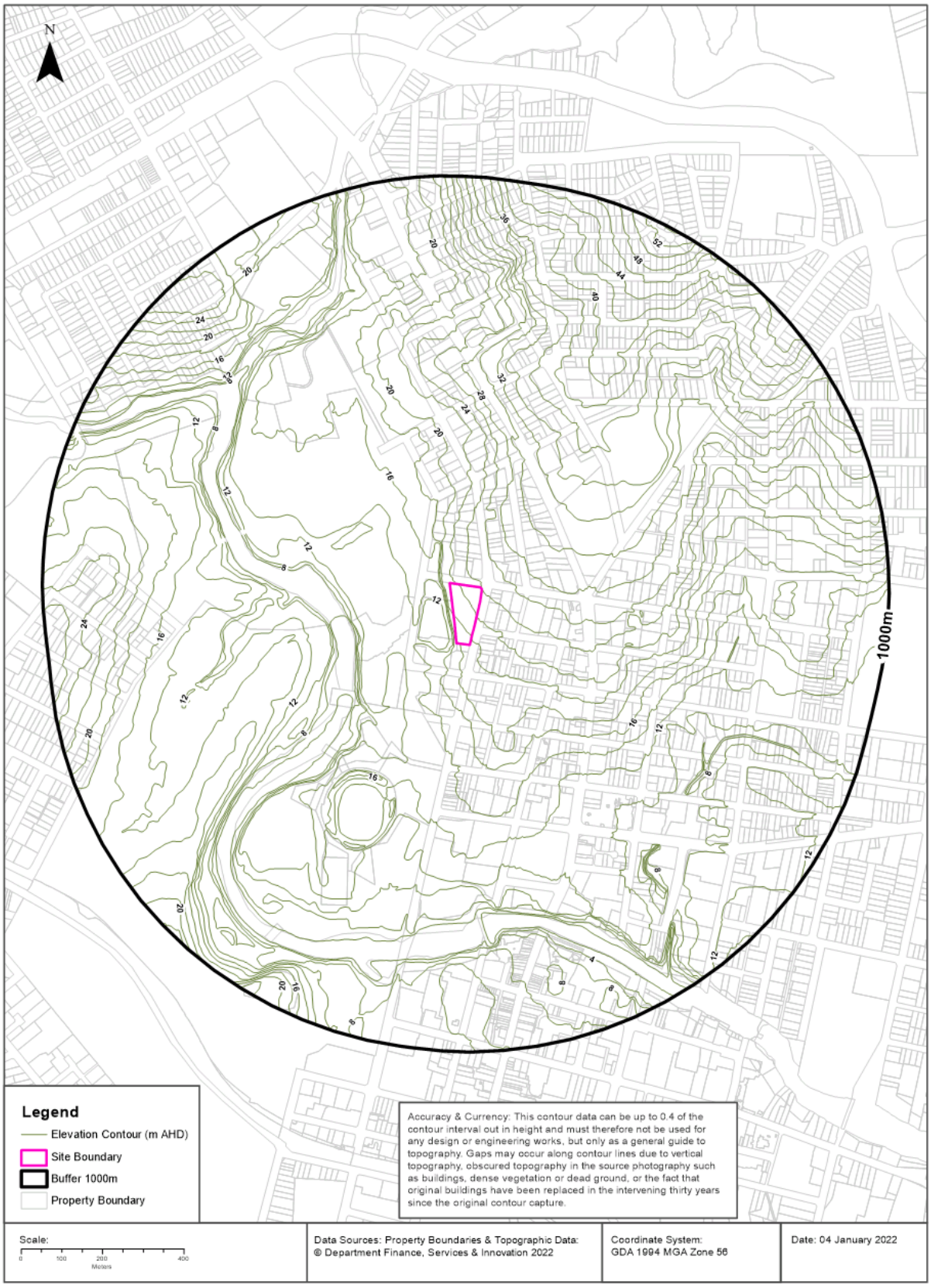

Hydrogeology & Groundwater

9 Albert Street, North Parramatta, NSW 2151

Hydrogeology

Description of aquifers within the dataset buffer:

Description	Distance	Direction
Porous, extensive aquifers of low to moderate productivity	0m	On-site

Hydrogeology Map of Australia : Commonwealth of Australia (Geoscience Australia)
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Temporary Water Restriction (Botany Sands Groundwater Source) Order 2018

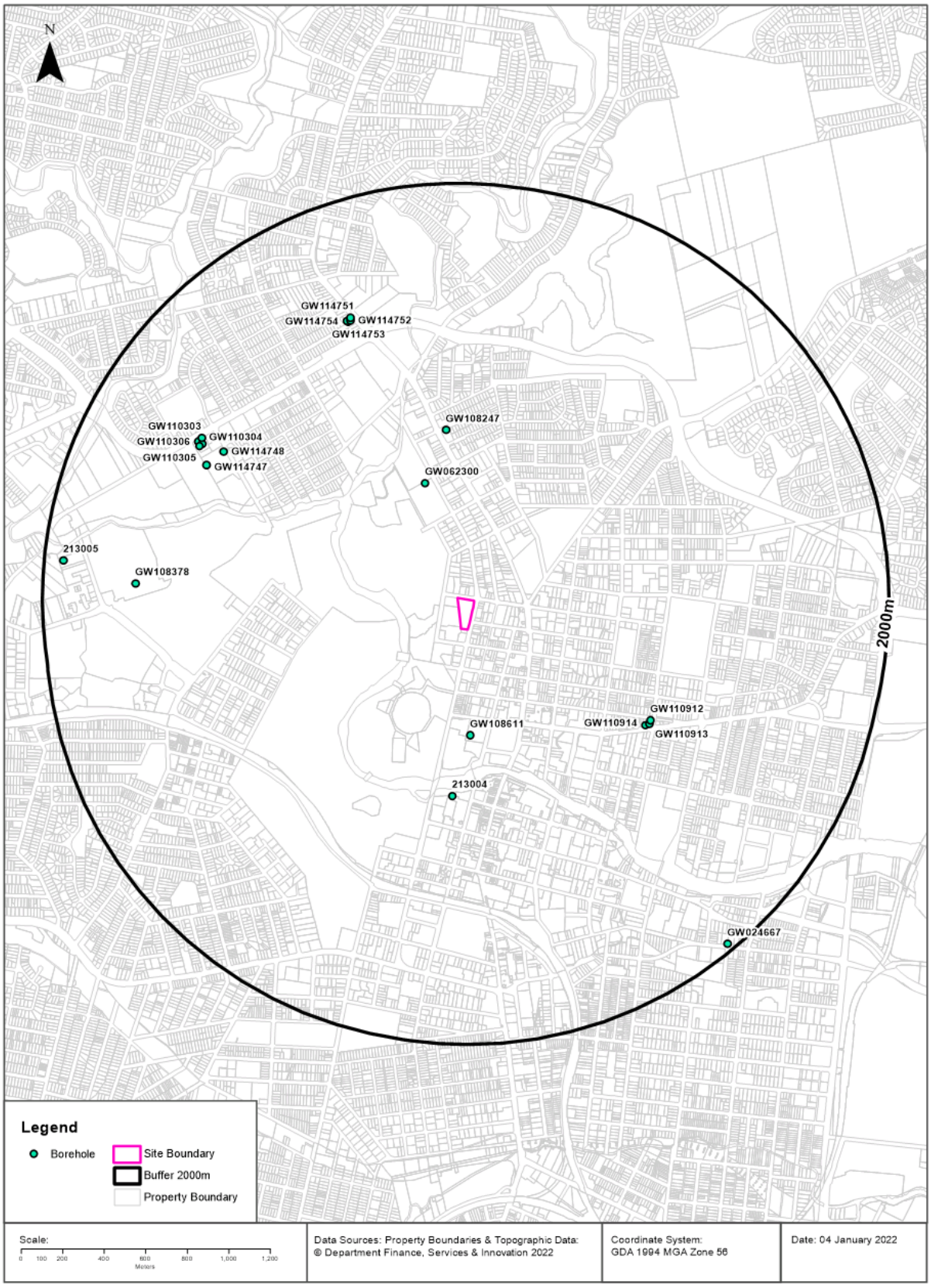
Temporary water restrictions relating to the Botany Sands aquifer within the dataset buffer:

Prohibition Area No.	Prohibition	Distance	Direction
N/A	No records in buffer		

Temporary Water Restriction (Botany Sands Groundwater Source) Order 2018 Data Source : NSW Department of Primary Industries

Groundwater Boreholes

9 Albert Street, North Parramatta, NSW 2151



Hydrogeology & Groundwater

9 Albert Street, North Parramatta, NSW 2151

Groundwater Boreholes

Boreholes within the dataset buffer:

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m bgl)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW108611	10BL162941, 10WA108668	Bore	Private	Domestic	Domestic		20/04/2005	60.50	60.50	5300	6.20	5.500		510m	South
GW062300	10BL137938, 10WA109363	Bore	Other Govt	Industrial	Industrial		01/07/1988	100.00	100.00	Fresh				574m	North
213004					UNK								11.75	806m	South
GW108247	10BL601222, 10BL601930	Bore		Industrial, Test Bore	Industrial		22/03/2007	102.00	102.00	2000	10.00	0.100		810m	North
GW110914	10BL603583	Well	Private	Monitoring Bore	Monitoring Bore		20/01/2010	6.00	6.00		5.00			975m	South East
GW110912	10BL603583	Well	Private	Monitoring Bore	Monitoring Bore		20/01/2010	10.00	10.00		7.00			985m	South East
GW110913	10BL603583	Well	Private	Monitoring Bore	Monitoring Bore		20/01/2010	10.00	10.00		7.00			988m	South East
GW114748	10BL605601	Bore	Private	Monitoring Bore	Monitoring Bore		12/05/2014	14.00	14.50	280	7.00			1327m	North West
GW114747	10BL605601	Bore	Private	Monitoring Bore	Monitoring Bore		12/05/2014	14.00	10.00	235	7.00			1368m	North West
GW114753	10BL605661	Bore	Private	Monitoring Bore	Monitoring Bore	7 ELEVEN	25/08/2014	9.00	12.00		8.20			1429m	North
GW114752	10BL605661	Bore	Private	Monitoring Bore	Monitoring Bore	7 ELEVEN	21/01/2015	12.00	12.00		9.40			1432m	North
GW110304	10BL603076	Well	Private	Monitoring Bore	Monitoring Bore		28/05/2009	10.00	10.00		3.60			1436m	North West
GW114754	10BL605661	Bore	Private	Monitoring Bore	Monitoring Bore	7 ELEVEN	25/08/2014	9.00	12.00		9.90			1436m	North
GW110305	10BL603076	Well	Private	Monitoring Bore	Monitoring Bore		28/05/2009	10.00	10.00		4.80			1441m	North West
GW114751	10BL605661	Bore	Private	Monitoring Bore	Monitoring Bore	7 ELEVEN	25/08/2014	9.00	9.00		6.90			1446m	North
GW110303	10BL603076	Well	Private	Monitoring Bore	Monitoring Bore		28/05/2009	10.00	10.00		3.20			1452m	North West
GW110306	10BL603076	Well	Private	Monitoring Bore	Monitoring Bore		28/05/2009	10.00	10.00		4.30			1457m	North West
GW108378	10BL165559, 10BL602047, 10WA109505	Bore		Industrial, Test Bore	Industrial		31/01/2006	282.00	282.00			0.800		1551m	West
213005					UNK								16.22	1906m	West
GW024667	10BL019073, 10WA108142	Well	Private	Domestic	General Use		01/10/1966	4.50	4.60	Fresh				1967m	South East

Borehole Data Source : NSW Department of Primary Industries - Office of Water / Water Administration Ministerial Corporation for all bores prefixed with GW. All other bores © Commonwealth of Australia (Bureau of Meteorology) 2015. Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Hydrogeology & Groundwater

9 Albert Street, North Parramatta, NSW 2151

Driller's Logs

Drill log data relevant to the boreholes within the dataset buffer:

Groundwater No	Drillers Log	Distance	Direction
GW108611	0.00m-1.00m Fill 1.00m-3.00m Clay, brown 3.00m-5.50m Shale 5.50m-7.00m Sandstone, with Shale bedding 7.00m-22.00m Sandstone, grey 22.00m-23.30m Sandstone, soft 23.30m-46.10m Sandstone, grey 46.10m-46.30m Sandstone, fractured 46.30m-47.50m Sandstone, grey 47.50m-47.70m Sandstone, fractured 47.70m-56.50m Sandstone, grey 56.50m-56.60m Sandstone, fractured 56.60m-60.50m Sandstone, grey	510m	South
GW062300	0.00m-0.40m Topsoil 0.40m-5.60m Sandstone Some Layers 0.40m-5.60m Shale Clay 5.60m-9.50m Sandstone Yellow 9.50m-12.10m Shale 12.10m-26.80m Sandstone Grey Water Supply 26.80m-37.70m Sandstone Grey Some Shale 37.70m-38.10m Shale 38.10m-100.00m Sandstone Grey Water Supply	574m	North
GW108247	0.00m-3.00m SANDY CLAY 3.00m-6.00m SANDSTONE YELLOW 6.00m-10.50m SHALE 10.50m-14.50m SANDSTONE GREY 14.50m-14.80m SANDSTONE FRACTURED 14.80m-22.50m SANDSTONE GREY 22.50m-27.00m SANDSTONE QUARTZ 27.00m-29.00m SANDSTONE GREY 29.00m-30.00m SHALE 30.00m-44.00m SANDSTONE GREY 44.00m-46.50m SHALE 46.50m-55.00m SANDSTONE GREY 55.00m-57.00m SANDSTONE QUARTZ 57.00m-70.00m SANDSTONE GREY 70.00m-72.00m SANDSTONE QUARTZ 72.00m-74.00m SHALE 74.00m-76.00m SANDSTONE GREY 76.00m-77.00m SANDSTONE QUARTZ 77.00m-80.50m SANDSTONE GREY 80.50m-83.50m SANDSTONE QUARTZ 83.50m-93.00m SANDSTONE GREY 93.00m-94.50m SANDSTONE QUARTZ 94.50m-99.00m SANDSTONE GREY 99.00m-100.50m SANDSTONE QUARTZ 100.50m-102.00m SANDSTONE GREY	810m	North
GW110914	0.00m-0.20m FILL, SILTY SAND BROWN 0.20m-0.40m FILL,SANDY CLAY RED GREY 0.40m-1.10m FILL SANDY CLAY RED 1.10m-2.50m CLAY SANDY RED 2.50m-3.20m CLAY RED 3.20m-5.00m SILTSTONE, SHALE FRAGMENTS 5.00m-5.50m CLAY SANDY BROWN 5.50m-6.00m SANDSTONE BROWN LOW STRENGTH	975m	South East
GW110912	0.00m-0.10m CONCRETE 0.10m-0.50m FILL,SILTY CLAY, GRAVEL 0.50m-1.80m CLAY SANDY GREY RED 1.80m-2.50m CLAY SANDY GREY BROWN 2.50m-3.00m CLAY SANDY GREY 3.00m-3.50m CLAY SANDY SOME SHALE FRAGMENTS 3.50m-4.30m SHALE CLAY BROWN 4.30m-5.00m SHALE LOW STRENGTH,IRONSTONE,SANDSTONE 5.00m-5.20m SHALE LOW STRENGTH DARK GREY 5.20m-6.50m SHALE LOW STRENGTH BROWN SANDSTONE BANDS 6.50m-6.80m SANDSTONE LOW STRENGTH WHITE 6.80m-10.00m SANDSTONE MEDIUM STRENGTH WHITE	985m	South East

Groundwater No	Drillers Log	Distance	Direction
GW110913	0.00m-0.10m CONCRETE 0.10m-0.20m CLAY SILTY RED BROWN 0.20m-1.20m CLAY SANDY RED BROWN 1.20m-2.00m CLAY SANDY RED 2.00m-3.50m CLAY SANDY BROWN 3.50m-4.50m CLAY SANDY BROWN/SHALE 4.50m-4.90m SANDSTONE BROWN LOW STRENGTH 4.90m-6.00m CLAY SANDY BROWN SHALE FRAGMENTS 6.00m-6.20m SANDSTONE WEATHERED GREY WHITE 6.20m-10.00m SANDSTONE WHITE	988m	South East
GW114748	0.00m-1.50m SAND CLAYEY WITH TRACE OF ASPHALT,GRAVELS 1.50m-2.80m SANDY CLAY,ORANGE AND BROWN LOW PLASTICITY 2.80m-3.70m CLAY GRAVELLY DARK ORANGE AND BROWN,IRONSTONE AND GRAVELS 3.70m-4.50m SANDY CLAY,TRACE IRONSTONE,GRAVELS 4.50m-5.70m SANDY CLAY ,IRONSTONE 5.70m-14.50m SANDSTONE WITH IRONSTONE BANDS LIGHT BANDS	1327m	North West
GW114747	0.00m-0.80m GRAVELLY CLAY BROWN,.LOW,MEDIUM PLASTICITY 0.80m-5.70m CLAY GRAVELLY, RED AND GREY,IRONSTONE,GRAVELS 5.70m-10.00m SANDSTONE, GREY AND YELLOW,FINE-MED.GRAINED	1368m	North West
GW114753	0.00m-0.17m CONCRETE 0.17m-0.30m FILL, GRAVEL 0.30m-0.55m FILL, SANDY CLAY RED BROWN 0.55m-7.00m SANDSTONE RED VERY HARD 7.00m-8.00m SHALE GREY 8.00m-12.00m SANDSTONE,YELLOW,VERY HARD	1429m	North
GW114752	0.00m-0.17m CONCRETE 0.17m-0.40m FILL,GRAVELLY SAND LOOSE 0.40m-12.00m SANDSTONE RED VERY HARD	1432m	North
GW110304	0.00m-1.00m FILL CLAYEY,SAND AND GRAVEL 1.00m-4.50m SAND CLAYEY BROWN AND RED/SANDSTONE 4.50m-10.00m SANDSTONE GREY AND BROWN	1436m	North West
GW114754	0.00m-0.18m CONCRETE 0.18m-0.40m FILL SANDY GRAVEL 0.40m-0.50m FILL SANDY CLAY 0.50m-7.00m SANDSTONE,RED,VERY HARD 7.00m-8.00m SHALE GREY 8.00m-12.00m SANDSTONE YELLOW,VERY HARD	1436m	North
GW110305	0.00m-0.20m CONCRETE 0.20m-0.40m FILL GRAVELLY SAND,SOME CLAY 0.40m-0.90m FILL GRAVELLY SAND,FINE TO COARSE GRAINED 0.90m-1.30m FILL, SAND,GREY,SOME GRAVEL,SOME CLAY 1.30m-2.50m CLAY SANDY,LOW TO MEDIUM PLASTICITY 2.50m-10.00m SANDSTONE,FINE TO MEDIUM GRAINED,GREY	1441m	North West
GW114751	0.00m-0.17m CONCRETE 0.17m-0.30m FILL GRAVEL,SAND COARSE GRAINED 0.30m-0.50m FILL SANDY CLAY BROWN ORANGE 0.50m-9.00m SANDSTONE RED VERY HARD	1446m	North
GW110303	0.00m-0.70m FILL BROWN,CLAYEY SAND/GRAVEL/ROCKS 0.70m-2.50m CLAY SANDY GREY AND BROWN 2.50m-3.50m CLAY GRAVELLY DARK GREY 3.50m-10.00m SANDSTONE GREY AND BROWN,WEATHERED	1452m	North West
GW110306	0.00m-0.60m CONCRETE 0.60m-0.80m FILL, GRAVELLY SAND 0.80m-1.00m FILL, SANDSTONE 1.00m-1.20m FILL, SANDY CLAY 1.20m-5.50m CLAY SANDY,MEDIUM TO HIGH PLASTICITY 5.50m-10.00m SANDSTONE,FINE TO MEDIUM GRAINED	1457m	North West
GW108378	0.00m-0.20m TOPSOIL 0.20m-2.00m CLAY 2.00m-19.00m SHALE 19.00m-62.00m SANDSTONE 62.00m-64.00m GREY SHALE 64.00m-123.00m SANDSTONE 123.00m-127.00m GREY SHALE 127.00m-164.00m SANDSTONE 164.00m-168.00m GREY SHALE 168.00m-176.00m SANDSTONE 176.00m-184.00m GREY SHALE 184.00m-226.00m SANDSTONE 226.00m-236.00m GREY SHALE 236.00m-260.00m SANDSTONE 260.00m-282.00m GREY SHALE	1551m	West
GW024667	0.00m-4.57m Sand Water Supply	1967m	South East

Drill Log Data Source: NSW Department of Primary Industries - Office of Water / Water Administration Ministerial Corp
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Geology

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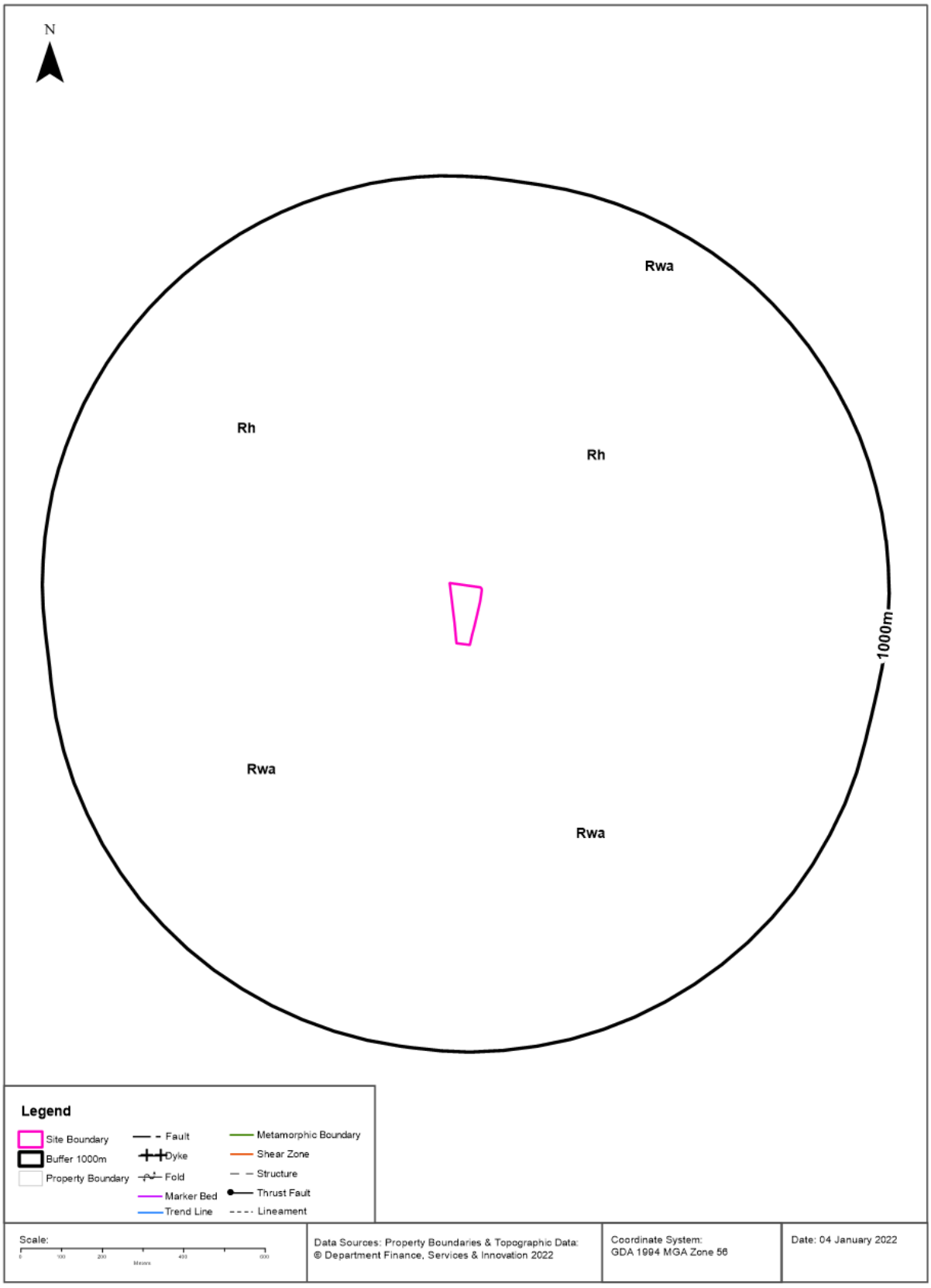

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Geology

9 Albert Street, North Parramatta, NSW 2151

Geological Units 1:100,000

What are the Geological Units within the dataset buffer?

Symbol	Description	Unit Name	Group	Sub Group	Age	Dom Lith	Map Sheet	Dist	Dir
Rh	Medium to coarse grained quartz sandstone, very minor shale and laminate lenses				Triassic		Sydney	0m	On-site
Rwa	Black to dark grey shale and laminate	Ashfield Shale	Wianamatta Group		Triassic		Sydney	8m	South East
Rwa	Dark-grey to black claystone-siltstone and fine sandstone -siltstone laminate	Ashfield Shale	Wianamatta Group (undifferentiated)		Middle Triassic		Penrith	93m	South West
Rh	Medium to very coarse-grained quartz sandstone, minor laminated mudstone and siltstone leases	Hawkesbury Sandstone			Middle Triassic		Penrith	204m	North West

Geological Structures 1:100,000

What are the Geological Structures within the dataset buffer?

Feature	Name	Description	Map Sheet	Distance	Direction
N/A	No records in buffer				

Geological Data Source : NSW Department of Industry, Resources & Energy

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Naturally Occurring Asbestos Potential

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Naturally Occurring Asbestos Potential

Naturally Occurring Asbestos Potential within the dataset buffer:

Potential	Sym	Strat Name	Group	Formation	Scale	Min Age	Max Age	Rock Type	Dom Lith	Description	Dist	Dir
No records in buffer												

Naturally Occurring Asbestos Potential Data Source: © State of New South Wales through NSW Department of Industry, Resources & Energy

Atlas of Australian Soils

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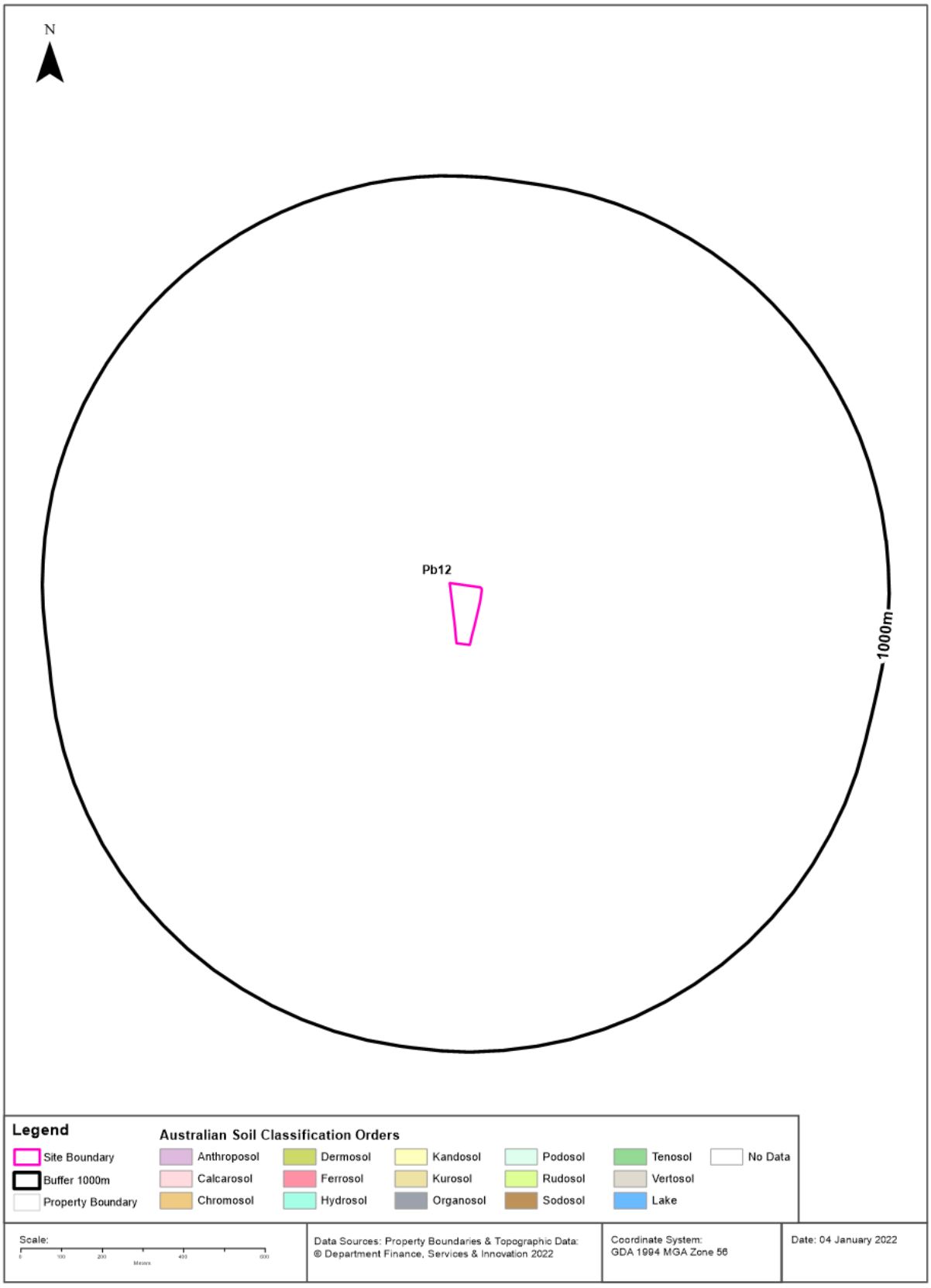

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Soils

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Atlas of Australian Soils

Soil mapping units and Australian Soil Classification orders within the dataset buffer:

Map Unit Code	Soil Order	Map Unit Description	Distance	Direction
Pb12	Kurosol	Gently rolling to rounded hilly country with some steep slopes and broad valleys: chief soils are hard acidic red soils (Dr2.21) with hard neutral and acidic yellow mottled soils (Dy3.42 and Dy3.41) on lower slopes and in valleys. Associated are small areas of various soils including (Gn3.54) on some ridges, (Dr3.31) on some slopes; (Dr2.23) in saddles and some mid-slope positions, and some low- lying swampy areas of (Uf6) soils and (Uc1.2) soils with peaty surfaces. Small areas of other soils such as (Db1.2) are likely throughout.	0m	On-site

Atlas of Australian Soils Data Source: CSIRO
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Soil Landscapes of Central and Eastern NSW

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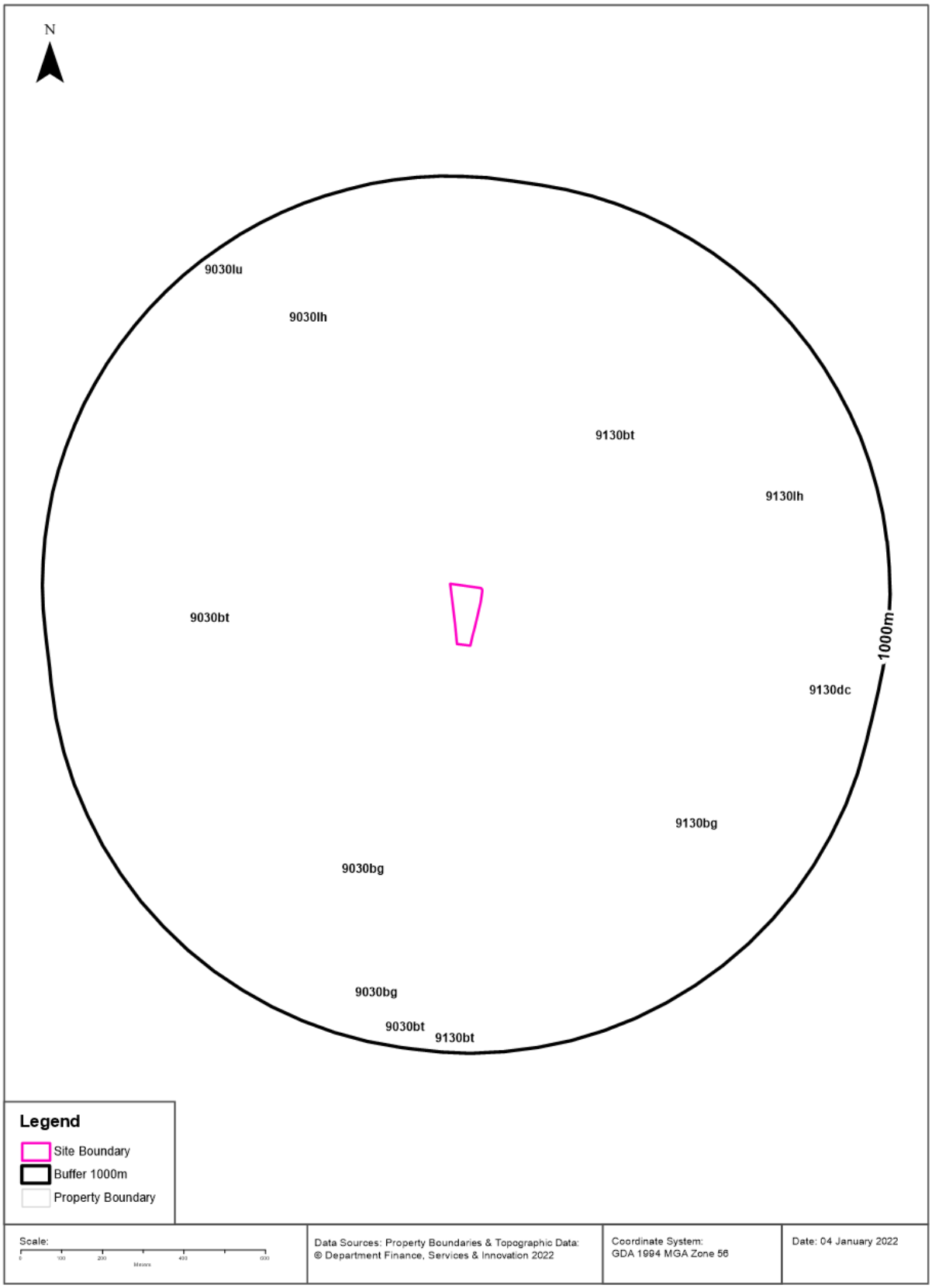

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Soils

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Soil Landscapes of Central and Eastern NSW

Soil Landscapes of Central and Eastern NSW within the dataset buffer:

Soil Code	Name	Distance	Direction
9130lh	Lucas Heights	0m	On-site
9130bt	Blacktown	72m	North East
9030lh	Lucas Heights	93m	North West
9030bt	Blacktown	203m	West
9130bg	Birrong	328m	South East
9030bg	Birrong	347m	South
9130dc	Deep Creek	738m	East
9030lu	Luddenham	897m	North West

Soil Landscapes of Central and Eastern NSW: NSW Department of Planning, Industry and Environment
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Acid Sulfate Soils

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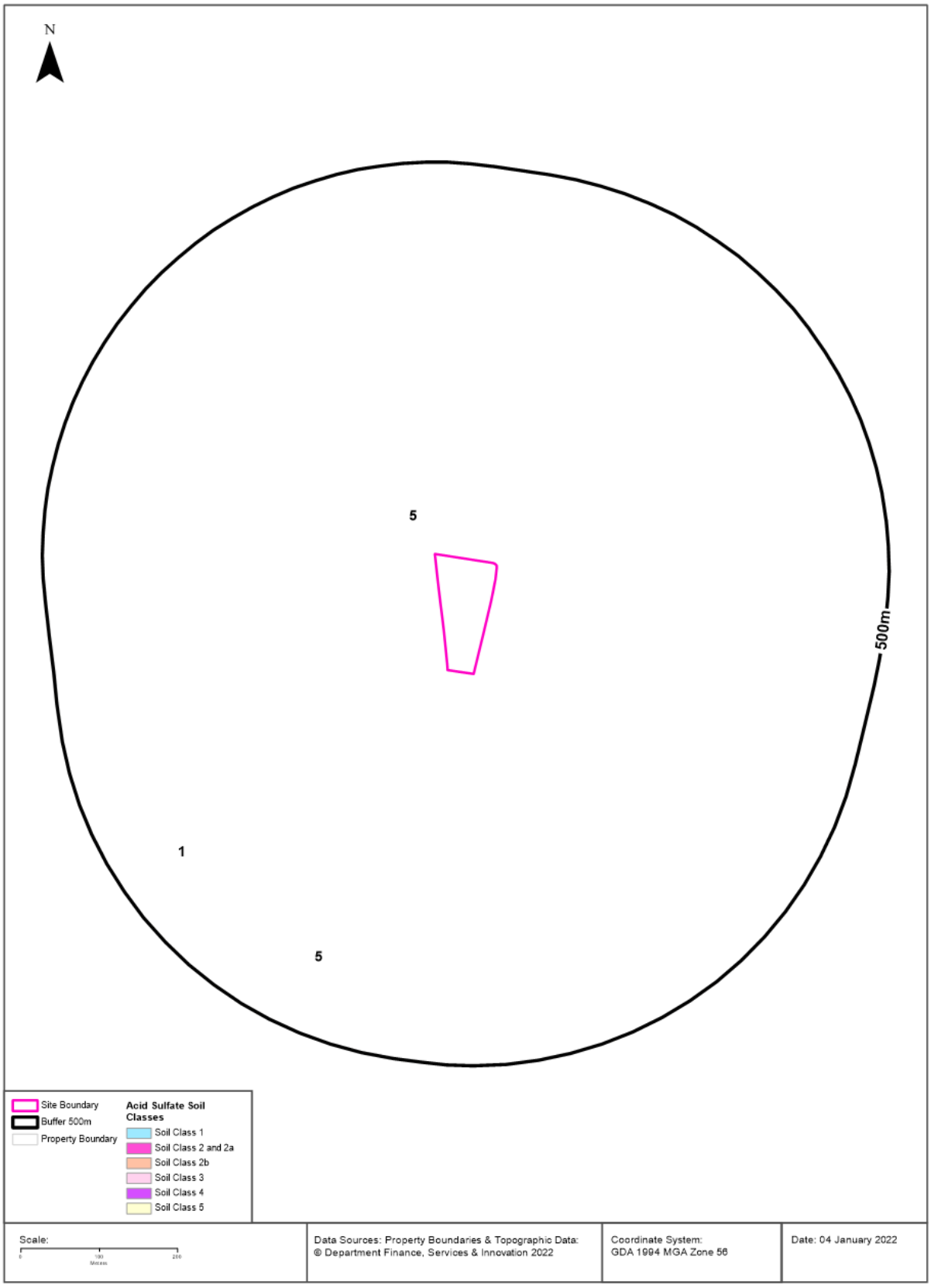

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Acid Sulfate Soils

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Environmental Planning Instrument - Acid Sulfate Soils

What is the on-site Acid Sulfate Soil Plan Class that presents the largest environmental risk?

Soil Class	Description	EPI Name
5	Works within 500 metres of adjacent Class 1, 2, 3, or 4 land that is below 5 metres AHD and by which the watertable is likely to be lowered below 1 metre AHD on adjacent Class 1, 2, 3 or 4 land, present an environmental risk	Parramatta Local Environmental Plan 2011

If the on-site Soil Class is 5, what other soil classes exist within 500m?

Soil Class	Description	EPI Name	Distance	Direction
1	Any works present an environmental risk	Parramatta Local Environmental Plan 2011	323m	South West

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Atlas of Australian Acid Sulfate Soils

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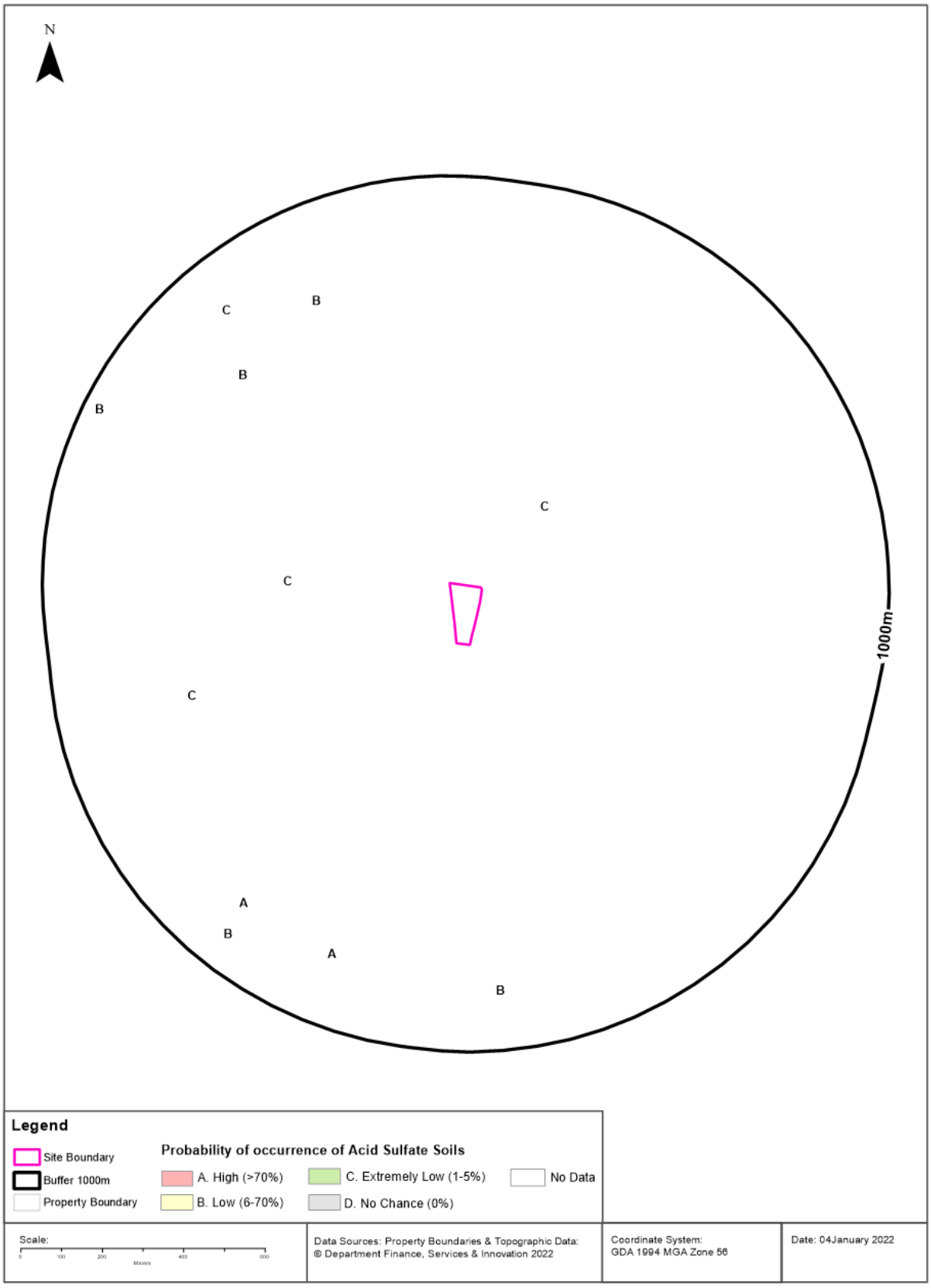

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Acid Sulfate Soils

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Atlas of Australian Acid Sulfate Soils

Atlas of Australian Acid Sulfate Soil categories within the dataset buffer:

Class	Description	Distance	Direction
C	Extremely low probability of occurrence. 1-5% chance of occurrence with occurrences in small localised areas.	0m	On-site
A	High Probability of occurrence. >70% chance of occurrence.	526m	South West
B	Low Probability of occurrence. 6-70% chance of occurrence.	698m	North West

Atlas of Australian Acid Sulfate Soils Data Source: CSIRO

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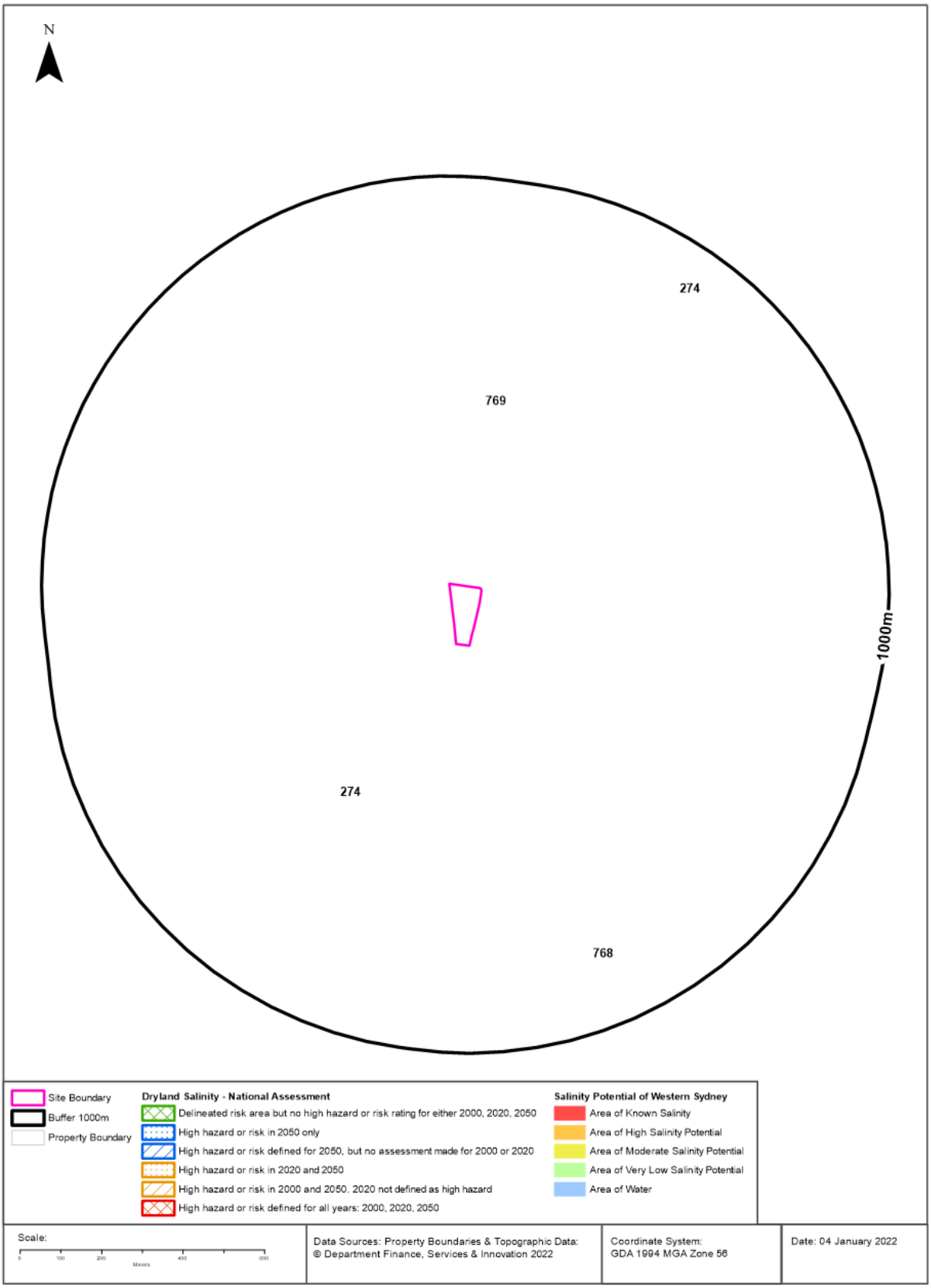
Dryland Salinity

9 Albert Street, North Parramatta, NSW 2151



Dryland Salinity

9 Albert Street, North Parramatta, NSW 2151

Dryland Salinity - National Assessment

Is there Dryland Salinity - National Assessment data onsite?

No

Is there Dryland Salinity - National Assessment data within the dataset buffer?

No

What Dryland Salinity assessments are given?

Assessment 2000	Assessment 2020	Assessment 2050	Distance	Direction
N/A	N/A	N/A		

Dryland Salinity Data Source : National Land and Water Resources Audit
The Commonwealth and all suppliers of source data used to derive the maps of "Australia, Forecast Areas Containing Land of High Hazard or Risk of Dryland Salinity from 2000 to 2050" do not warrant the accuracy or completeness of information in this product. Any person using or relying upon such information does so on the basis that the Commonwealth and data suppliers shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information. Any persons using this information do so at their own risk.
In many cases where a high risk is indicated, less than 100% of the area will have a high hazard or risk.

Dryland Salinity Potential of Western Sydney

Dryland Salinity Potential of Western Sydney within the dataset buffer?

Feature Id	Classification	Description	Distance	Direction
274	MODERATE	Area of Moderate Salinity Potential	0m	On-site
769	LOW	Area of Very Low Salinity Potential	0m	On-site
768	WATER	Area of Water	685m	South

Dryland Salinity Potential of Western Sydney Data Source : NSW Office of Environment and Heritage
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Mining

9 Albert Street, North Parramatta, NSW 2151

Mining Subsidence Districts

Mining Subsidence Districts within the dataset buffer:

District	Distance	Direction
There are no Mining Subsidence Districts within the report buffer		

Mining Subsidence District Data Source: © Land and Property Information (2016)
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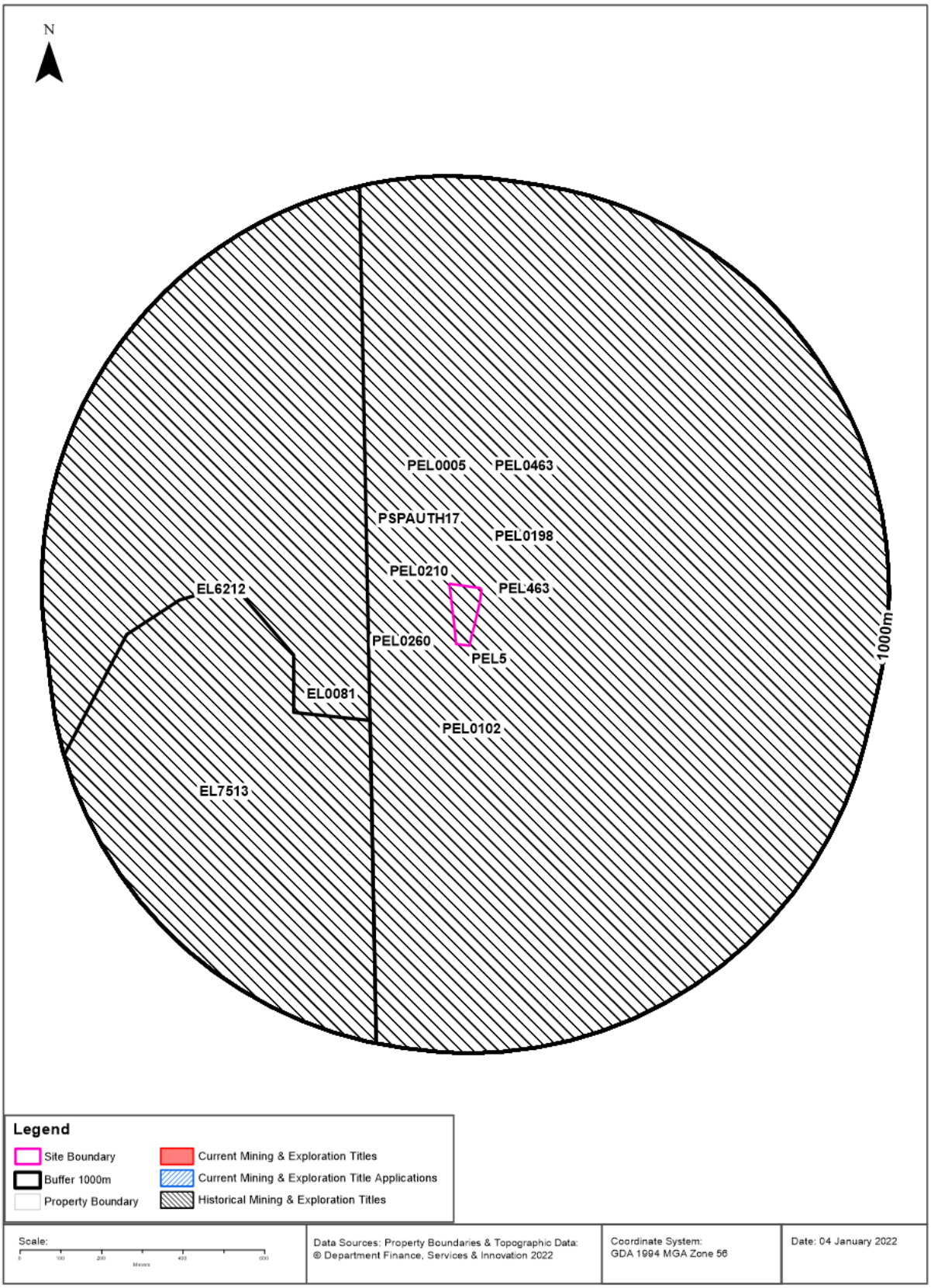
Mining & Exploration Titles

9 Albert Street, North Parramatta, NSW 2151



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Mining

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Current Mining & Exploration Titles

Current Mining & Exploration Titles within the dataset buffer:

Title Ref	Holder	Grant Date	Expiry Date	Last Renewed	Operation	Resource	Minerals	Dist	Dir
N/A	No records in buffer								

Current Mining & Exploration Titles Data Source: © State of New South Wales through NSW Department of Industry

Current Mining & Exploration Title Applications

Current Mining & Exploration Title Applications within the dataset buffer:

Application Ref	Applicant	Application Date	Operation	Resource	Minerals	Dist	Dir
N/A	No records in buffer						

Current Mining & Exploration Title Applications Data Source: © State of New South Wales through NSW Department of Industry

Mining

9 Albert Street, North Parramatta, NSW 2151

Historical Mining & Exploration Titles

Historical Mining & Exploration Titles within the dataset buffer:

Title Ref	Holder	Start Date	End Date	Resource	Minerals	Dist	Dir
PEL0102	AUSTRALIAN OIL AND GAS CORPORATION LTD			PETROLEUM	Petroleum	0m	On-site
PSPAUTH17	MACQUARIE ENERGY PTY LTD	8/03/2007	7/03/2008	PETROLEUM	Petroleum	0m	On-site
PEL0005	AGL UPSTREAM INVESTMENTS PTY LIMITED	11/11/1993	4/03/2015	PETROLEUM	Petroleum	0m	On-site
PEL0463	DART ENERGY (APOLLO) PTY LTD	22/10/2008	6/03/2015	PETROLEUM	Petroleum	0m	On-site
EL0081	CONTINENTAL OIL CO OF AUSTRALIA LIMITED	01 Feb 1967	01 Feb 1968	MINERALS		0m	On-site
PEL0210	THE AUSTRALIAN GAS LIGHT COMPANY (AGL), NORTH BULLI COLLIERIES PTY LTD			PETROLEUM	Petroleum	0m	On-site
PEL463	DART ENERGY (APOLLO) PTY LTD			MINERALS		0m	On-site
PEL5	AGL UPSTREAM INVESTMENTS PTY LIMITED			MINERALS		0m	On-site
PEL0198	JOHN STREVENS (TERRIGAL) NL			PETROLEUM	Petroleum	0m	On-site
PEL0260	NORTH BULLI COLLIERIES PTY LTD, AGL PETROLEUM OPERATIONS PTY LTD, THE AUSTRALIAN GAS LIGHT CO.	9/09/1981	8/03/1993	PETROLEUM	Petroleum	0m	On-site
EL6212	HOT ROCK ENERGY PTY LTD,LONGREACH OIL LIMITED	4 Mar 2004	3 Mar 2013	MINERALS	Geothermal	200m	West
EL7513	GRADIENT ENERGY LIMITED	7 Apr 2010	15 Apr 2011	MINERALS	Geothermal	283m	South West

Historical Mining & Exploration Titles Data Source: © State of New South Wales through NSW Department of Industry

State Environmental Planning Policy

9 Albert Street, North Parramatta, NSW 2151

State Significant Precincts

What SEPP State Significant Precincts exist within the dataset buffer?

Map Id	Precinct	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
N/A	No records in buffer							

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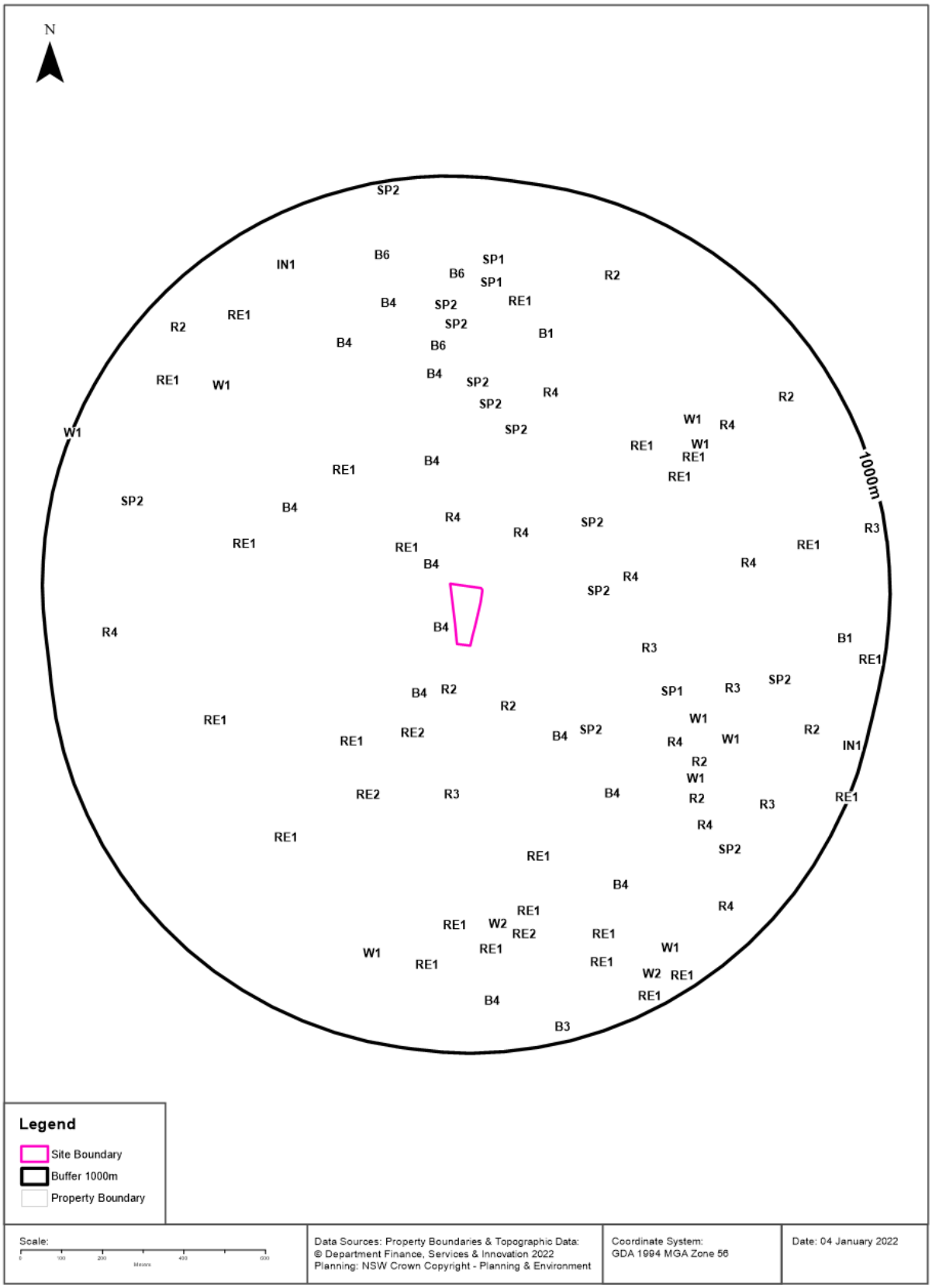
EPI Planning Zones

9 Albert Street, North Parramatta, NSW 2151



Environmental Planning Instrument

9 Albert Street, North Parramatta, NSW 2151

Land Zoning

What EPI Land Zones exist within the dataset buffer?

Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
B4	Mixed Use		Parramatta Local Environmental Plan 2011	20/11/2015	20/11/2015	18/06/2021	State Environmental Planning Policy Amendment (Parramatta North) 2015	0m	On-site
R4	High Density Residential		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		0m	North
SP2	Infrastructure	Classified Road	Parramatta Local Environmental Plan 2011	21/02/2020	21/02/2020	18/06/2021	Amendment No 40	0m	North
R2	Low Density Residential		Parramatta Local Environmental Plan 2011	21/02/2020	21/02/2020	18/06/2021	Amendment No 40	21m	South East
R4	High Density Residential		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		25m	North East
B4	Mixed Use		Parramatta Local Environmental Plan 2011	20/11/2015	20/11/2015	18/06/2021	State Environmental Planning Policy Amendment (Parramatta North) 2015	25m	North West
R2	Low Density Residential		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		63m	South
B4	Mixed Use		Parramatta Local Environmental Plan 2011	20/11/2015	20/11/2015	18/06/2021	State Environmental Planning Policy Amendment (Parramatta North) 2015	79m	North West
RE1	Public Recreation		Parramatta Local Environmental Plan 2011	20/11/2015	20/11/2015	18/06/2021	State Environmental Planning Policy Amendment (Parramatta North) 2015	83m	North West
B4	Mixed Use		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		86m	South West
RE2	Private Recreation		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		181m	South West
B4	Mixed Use		Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	18/06/2021	Amendment No 10	204m	South East
RE1	Public Recreation		Parramatta Local Environmental Plan 2011	20/11/2015	20/11/2015	18/06/2021	State Environmental Planning Policy Amendment (Parramatta North) 2015	210m	West
SP2	Infrastructure	Classified Road	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	18/06/2021	Amendment No 10	240m	South East
W1	Natural Waterways		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		242m	North West
SP2	Infrastructure	Cemetery	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		253m	North East
RE1	Public Recreation		Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	18/06/2021	Amendment No 10	270m	South West

Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
B4	Mixed Use		Parramatta Local Environmental Plan 2011	20/11/2015	20/11/2015	18/06/2021	State Environmental Planning Policy Amendment (Parramatta North) 2015	272m	North
SP2	Infrastructure	Classified Road	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	18/06/2021	Amendment No 10	272m	East
B4	Mixed Use		Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	18/06/2021	Amendment No 10	272m	South East
RE1	Public Recreation		Parramatta Local Environmental Plan 2011	20/11/2015	20/11/2015	18/06/2021	State Environmental Planning Policy Amendment (Parramatta North) 2015	278m	North West
R4	High Density Residential		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		279m	North East
RE2	Private Recreation		Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	18/06/2021	Amendment No 10	280m	South West
W1	Natural Waterways		Parramatta Local Environmental Plan 2011	21/02/2020	21/02/2020	18/06/2021	Amendment No 40	281m	South
RE1	Public Recreation		Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	18/06/2021	Amendment No 10	296m	South West
SP2	Infrastructure	Health Services Facilities	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		303m	West
R4	High Density Residential		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		307m	East
R3	Medium Density Residential		Parramatta Local Environmental Plan 2011	21/02/2020	21/02/2020	18/06/2021	Amendment No 40	315m	South
RE1	Public Recreation		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		354m	North East
B4	Mixed Use		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		378m	North West
R3	Medium Density Residential		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		389m	South East
RE1	Public Recreation		Parramatta Local Environmental Plan 2011	21/02/2020	21/02/2020	18/06/2021	Amendment No 40	413m	South West
B4	Mixed Use		Parramatta Local Environmental Plan 2011	21/02/2020	21/02/2020	18/06/2021	Amendment No 40	425m	South
B6	Enterprise Corridor		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		426m	North
SP2	Infrastructure	Strategic Bus Corridor	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		429m	North
R2	Low Density Residential		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		449m	North East
RE1	Public Recreation		Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	18/06/2021	Amendment No 10	462m	South
B4	Mixed Use		Parramatta Local Environmental Plan 2011	20/11/2015	20/11/2015	18/06/2021	State Environmental Planning Policy Amendment (Parramatta North) 2015	470m	North
SP1	Special Activities	Place of Public Worship	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		476m	East
SP2	Infrastructure	Strategic Bus Corridor	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		478m	North
B6	Enterprise Corridor		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		501m	North
R3	Medium Density Residential		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		506m	East
R4	High Density Residential		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		517m	South East
R4	High Density Residential		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		520m	East
RE1	Public Recreation		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		538m	North East

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Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
W1	Natural Waterways		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		585m	South East
RE1	Public Recreation		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		589m	South East
B1	Neighbourhood Centre		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		595m	North
SP2	Infrastructure	Classified Road	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		604m	South East
RE1	Public Recreation		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		606m	North East
B4	Mixed Use		Parramatta Local Environmental Plan 2011	20/11/2015	20/11/2015	18/06/2021	State Environmental Planning Policy Amendment (Parramatta North) 2015	612m	North
RE1	Public Recreation		Parramatta Local Environmental Plan 2011	21/02/2020	21/02/2020	18/06/2021	Amendment No 40	614m	South
R2	Low Density Residential		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		617m	South East
B6	Enterprise Corridor		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		617m	North
R2	Low Density Residential		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		620m	North East
R2	Low Density Residential		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		624m	South East
SP2	Infrastructure	Strategic Bus Corridor	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		629m	North
W1	Natural Waterways		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		635m	South East
W1	Natural Waterways		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		642m	North East
W1	Natural Waterways		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		643m	North East
RE1	Public Recreation		Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	18/06/2021	Amendment No 10	644m	South
RE1	Public Recreation		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		652m	North East
W1	Natural Waterways		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		653m	South East
R4	High Density Residential		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		654m	North East
R4	High Density Residential		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		658m	South East
R4	High Density Residential		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		660m	West
R3	Medium Density Residential		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		660m	South East
W2	Recreational Waterways		Parramatta Local Environmental Plan 2011	18/06/2021	18/06/2021	18/06/2021	Amendment No 62	662m	South
RE1	Public Recreation		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		668m	North
SP2	Infrastructure	Strategic Bus Corridor	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		669m	North
RE1	Public Recreation		Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	18/06/2021	Amendment No 10	691m	South East
R2	Low Density Residential		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		706m	East
RE1	Public Recreation		Parramatta Local Environmental Plan 2011	18/06/2021	18/06/2021	18/06/2021	Amendment No 62	707m	South
SP2	Infrastructure	Cemetery	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		708m	East
RE2	Private Recreation		Parramatta Local Environmental Plan 2011	18/06/2021	18/06/2021	18/06/2021	Amendment No 62	710m	South
B4	Mixed Use		Parramatta Local Environmental Plan 2011	18/06/2021	18/06/2021	18/06/2021	Amendment No 62	713m	South
R4	High Density Residential		Parramatta Local Environmental Plan 2011	21/02/2020	21/02/2020	18/06/2021	Amendment No 40	714m	South East

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Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
RE1	Public Recreation		Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	18/06/2021	Amendment No 10	727m	South
SP1	Special Activities	Place of Public Worship	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		728m	North
RE1	Public Recreation		Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	18/06/2021	Amendment No 10	739m	South
IN1	General Industrial		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		742m	North West
RE1	Public Recreation		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		744m	North West
RE1	Public Recreation		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		762m	East
SP1	Special Activities	Place of Public Worship	Parramatta Local Environmental Plan 2011	20/06/2014	20/06/2014	18/06/2021	Amendment No 8	765m	North
R2	Low Density Residential		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		772m	North West
R3	Medium Density Residential		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		798m	East
RE1	Public Recreation		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		814m	North West
W1	Natural Waterways		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		840m	South East
B1	Neighbourhood Centre		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		868m	East
B3	Commercial Core		Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	18/06/2021	Amendment No 10	899m	South
RE1	Public Recreation		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		905m	South East
W2	Recreational Waterways		Parramatta Local Environmental Plan 2011	03/05/2013	03/05/2013	18/06/2021	Amendment No 3	908m	South East
RE1	Public Recreation		Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	18/06/2021	Amendment No 10	932m	South East
RE1	Public Recreation		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		937m	East
IN1	General Industrial		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		949m	East
SP2	Infrastructure	Strategic Bus Corridor	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		971m	North
RE1	Public Recreation		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		985m	South East
W1	Natural Waterways		Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	18/06/2021		992m	North West

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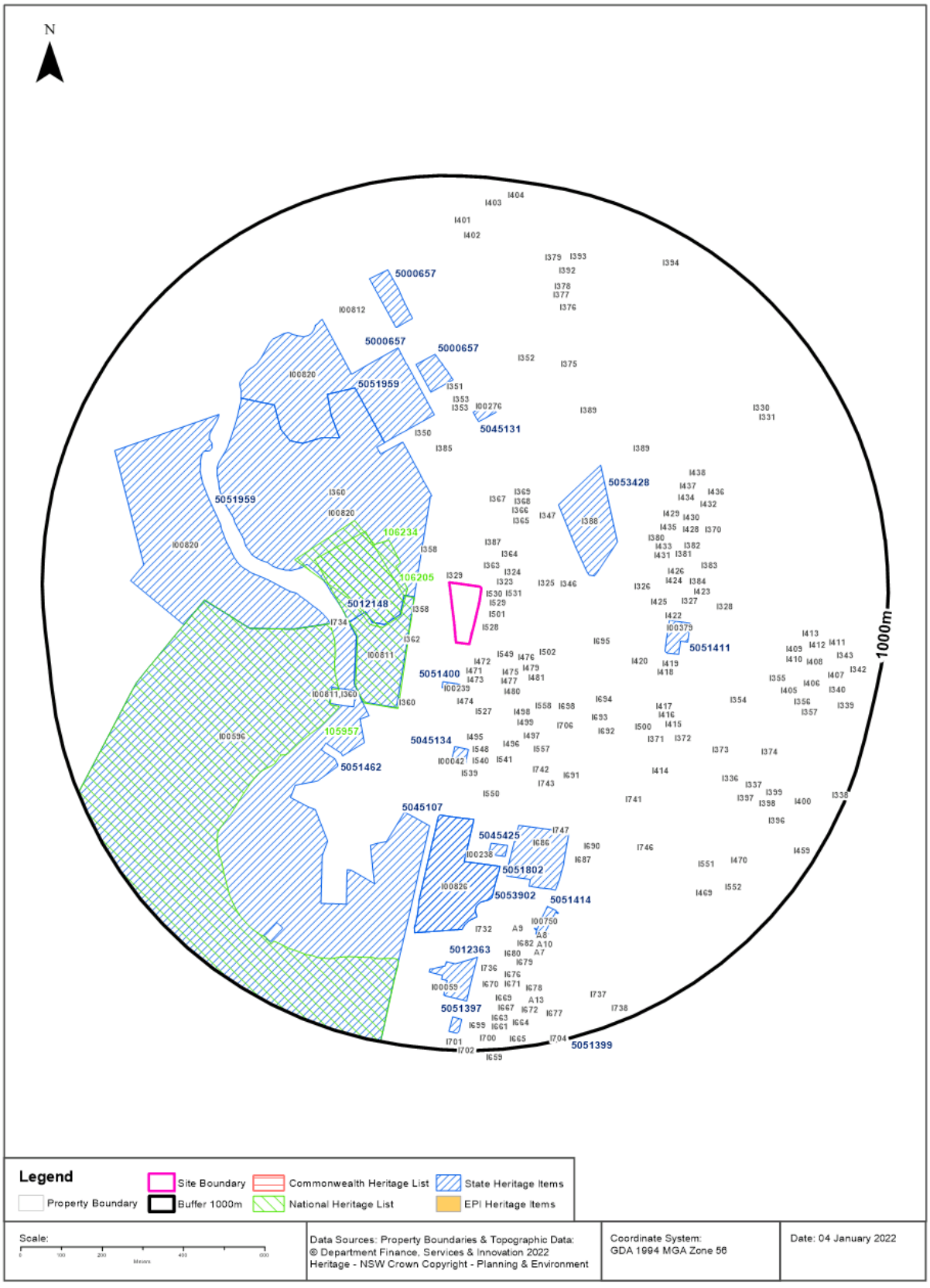
Heritage Items

9 Albert Street, North Parramatta, NSW 2151



Heritage

9 Albert Street, North Parramatta, NSW 2151

Commonwealth Heritage List

What are the Commonwealth Heritage List Items located within the dataset buffer?

Place Id	Name	Address	Place File No	Class	Status	Register Date	Distance	Direction
N/A	No records in buffer							

Heritage Data Source: Australian Government Department of the Environment and Energy - Heritage Branch
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National Heritage List

What are the National Heritage List Items located within the dataset buffer?
Note. Please click on Place Id to activate a hyperlink to online website.

Place Id	Name	Address	Place File No	Class	Status	Register Date	Distance	Direction
106205	Parramatta Female Factory Precinct	1 Fleet St, Parramatta NSW	1/10/028/0110	Historic	Nominated place		89m	West
106234	Former Female Factory Parramatta	Fleet St, Parramatta NSW	1/10/028/0110	Historic	Nominated place		103m	West
105957	Old Government House and the Government Domain	O'Connell St, Parramatta NSW	1/14/028/0109	Historic	Listed place	01/08/2007	296m	South West

Heritage Data Source: Australian Government Department of the Environment and Energy - Heritage Branch
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State Heritage Register - Curtilages

What are the State Heritage Register Items located within the dataset buffer?

Map Id	Name	Address	LGA	Listing Date	Listing No	Plan No	Distance	Direction
5051959	Cumberland District Hospital Group	5 Fleet Street Parramatta	CITY OF PARRAMATTA	02/04/1999	00820	2253	79m	North West
5012148	Norma Parker Correctional Centre	1 Fleet Street Parramatta	CITY OF PARRAMATTA	02/04/1999	00811	2229	90m	South West
5051400	Avondale	25 O'Connell Street Parramatta	CITY OF PARRAMATTA	02/04/1999	00239	556	100m	South
5051462	Parramatta Park and Old Government House	O'Connell Street, Parramatta	CITY OF PARRAMATTA	02/04/1999	00596	1547	242m	South West
5053428	St Patrick's Roman Catholic Cemetery	Pennant Hills Road, North Parramatta	CITY OF PARRAMATTA	23/03/2012	01880	1988	253m	North East
5045134	Roseneath Cottage	40-42 O'Connell Street Parramatta	CITY OF PARRAMATTA	02/04/1999	00042	211	255m	South
5051959	Cumberland District Hospital Group	5 Fleet Street Parramatta	CITY OF PARRAMATTA	02/04/1999	00820	2253	302m	West
5000657	Parramatta Correctional Centre	73 O'Connell Street Parramatta	CITY OF PARRAMATTA	02/04/1999	00812	2510	378m	North West
5045131	Oddfellows Arms Inn	541 Church Street Parramatta	CITY OF PARRAMATTA	02/04/1999	00276	683	401m	North

Map Id	Name	Address	LGA	Listing Date	Listing No	Plan No	Distance	Direction
5051802	Marsden Rehabilitation Centre Group	Marsden Street, Parramatta	CITY OF PARRAMATTA	02/04/1999	00826	1843	426m	South
5045107	Kings School Group (former)	3 Marist Place Parramatta	CITY OF PARRAMATTA	02/04/1999	00771	1843	426m	South
5053902	Prince Alfred Square and potential archaeological site	353 Church Street, Parramatta	CITY OF PARRAMATTA	28/08/2017	01997	3136	462m	South
5051411	Endrim	54 Sorrell Street Parramatta	CITY OF PARRAMATTA	02/04/1999	00379	887	468m	East
5000657	Parramatta Correctional Centre	73 O'Connell Street Parramatta	CITY OF PARRAMATTA	02/04/1999	00812	2510	470m	North
5045425	Murphys House	1 Marist Place Parramatta	CITY OF PARRAMATTA	02/04/1999	00238	555	493m	South
5000657	Parramatta Correctional Centre	73 O'Connell Street Parramatta	CITY OF PARRAMATTA	02/04/1999	00812	2510	640m	North
5051414	Lennox Bridge	349-351 (adj) Church Street Parramatta	CITY OF PARRAMATTA	02/04/1999	00750	1813	673m	South
5012363	Parramatta District Hospital - Archaeology	Marsden Street Parramatta	CITY OF PARRAMATTA	02/04/1999	00828	2689	769m	South
5051397	Parramatta District Hospital - Brislington and Landscape	10 George Street Parramatta	CITY OF PARRAMATTA	02/04/1999	00059	253	917m	South
5051399	Redcoats Mess House	Horwood Place, Parramatta	CITY OF PARRAMATTA	02/04/1999	00218	525	999m	South

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Environmental Planning Instrument - Heritage

What are the EPI Heritage Items located within the dataset buffer?

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
I358	Stone fence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	0m	West
	North Parramatta Conservation Area	Conservation Area - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	11m	South East
I329	Stone kerb and gutter	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	15m	North
I529	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	22m	East
I528	Hollywood	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	22m	South East
I530	Dorislea	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	22m	North East
I531	Residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	24m	North East
I471	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	41m	South
I501	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	48m	East
I472	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	50m	South

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
I323	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	57m	North East
I362	Stone kerbing and tree planting	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	59m	North West
I358	Stone fence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	62m	North West
I549	Weatherboard cottage	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	62m	South East
I324	Oakleight	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	70m	North East
I00820	Cumberland Hospital including Wisteria Gardens	Item - General	State	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	79m	North West
I360	Heritage brick drain	Item - General	Local	Parramatta Local Environmental Plan 2011	20/06/2014	20/06/2014	30/09/2021	79m	North West
I00239	Avondale	Item - General	State	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	82m	South
I473	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	84m	South
I363	Two-storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	86m	North East
I360	Heritage brick drain	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	86m	South West
I474	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	88m	South
I00811	Parramatta Girl's Training School	Item - General	State	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	90m	South West
I364	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	94m	North East
I387	Pair of cottages	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	99m	North East
I475	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	113m	South East
I476	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	134m	South East
I527	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	139m	South
I325	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	143m	East
I480	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	143m	South East
I477	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	144m	South East
I479	Conjoined residences	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	155m	South East
I481	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	176m	South East
I502	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	177m	South East

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Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
I365	Cottage	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	188m	North East
I346	Norfolk House and potential archaeological site	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	197m	East
I366	Timber cottages	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	204m	North East
I495	Conjoined residences	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	204m	South
I367	Nineteenth century cottages	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	205m	North
I498	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	208m	South East
I347	Single storey residence and potential archaeological site	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	211m	North East
I558	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	216m	South East
I368	Timber cottages	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	221m	North East
I499	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	225m	South East
I369	Timber cottage	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	238m	North East
I698	Stable (and potential archaeological site)	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	240m	South East
I00596	Parramatta Park and old government house	Item - General	State	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	242m	South West
I496	Conjoined residences	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	243m	South
I539	Single storey residence and potential archaeological site	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	249m	South
I548	Carlosa	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	251m	South
I388	Roman Catholic Cemetery	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	253m	North East
I00042	Roseneath and potential archaeological site	Item - General	State	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	255m	South
I497	Single storey residence and potential archaeological site	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	255m	South East
I734	Cumberland Hospital Weir	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	256m	West
I541	Lurlinea and potential archaeological site	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	258m	South
I547	Compax	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	263m	South
I00811,I360	Parramatta Girl's Training School / Heritage brick drain	Item - General	State	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	268m	South West

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
I540	Conjoined residences	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	276m	South
I557	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	279m	South East
I706	Single-storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	296m	South East
I695	Former bakery (and potential archaeological site)	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	300m	East
I00820	Cumberland Hospital including Wisteria Gardens	Item - General	State	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	303m	West
I385	Brick cottages	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	309m	North
I550	Convent of Our Lady of Mercy and associated buildings	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	318m	South
I694	Bicycle shop	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	335m	South East
I742	Single-storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	339m	South East
I743	Wine bar bistro	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	351m	South East
I693	Commercial building	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	352m	South East
I692	Shop	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	360m	South East
I350	Electrical substation	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	364m	North
I389	Horse trough	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	376m	North East
I00820	Cumberland Hospital including Wisteria Gardens	Item - General	State	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	378m	North West
	Sorrell Street Conservation Area	Conservation Area - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	389m	East
I326	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	389m	East
I691	Royal Oak Hotel and stables (and potential archaeological site)	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	392m	South East
I00276	Oddfellows Arms Inn	Item - General	State	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	401m	North
I420	Two storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	413m	East
I353	Stone kerb and gutter	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	422m	North
I353	Stone kerb and gutter	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	424m	North

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Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
I00826	Marsden Rehabilitation Centre and potential archaeological site	Item - General	State	Parramatta Local Environmental Plan 2011	21/02/2020	21/02/2020	30/09/2021	426m	South
I425	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	429m	East
I00238	St Patricks Cathedral, presbytery and precinct (and potential archaeological site)	Item - General	State	Parramatta Local Environmental Plan 2011	21/02/2020	21/02/2020	30/09/2021	431m	South
I380	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	433m	East
I351	Stone cottage (Parramatta TV & Video)	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	433m	North
I431	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	442m	East
I433	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	447m	East
I435	Conjoined residences	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	453m	East
I686	Alfred Square (and potential archaeological site)	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	462m	South
I500	Single storey residence and potential archaeological site	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	464m	South East
I00379	Endrim	Item - General	State	Parramatta Local Environmental Plan 2011	21/03/2014	21/03/2014	30/09/2021	468m	East
I422	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	468m	East
I423	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	473m	East
I419	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	474m	East
I424	Carinya	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	475m	East
I418	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	475m	East
I426	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	478m	East
I427	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	481m	East
I389	Horse trough	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	485m	North East
I417	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	486m	South East
I416	Timber cottage	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	489m	South East
I381	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	489m	East

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Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
I415	Two storey conjoined residences	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	492m	South East
I371	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	501m	South East
I382	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	506m	East
I747	Horse trough	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	507m	South East
I327	Whiteoak	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	508m	East
I428	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	512m	East
I384	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	513m	East
I429	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	520m	East
I383	Girraween	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	522m	East
I430	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	525m	East
I414	Gate posts of former villa	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	531m	South East
I432	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	545m	North East
I741	Electricity substation (and potential archaeological site)	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	548m	South East
I328	The Jones	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	548m	East
I352	Dunlop Street Group	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	549m	North
I434	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	551m	North East
I370	Residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	552m	East
I436	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	557m	North East
I437	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	563m	North East
I372	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	567m	South East
I00812	Parramatta Correctional Centre	Item - General	State	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	569m	North
I438	Conjoined residences & single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	574m	North East
I690	Anthony Malouf and Co	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	575m	South East

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Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
I375	Stone cottage	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	579m	North East
I687	St Peters Uniting Church and studio theatre (and potential archaeological site)	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	582m	South East
I746	Rose and Crown Hotel (and potential archaeological site)	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	638m	South East
I373	Grose Manor	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	659m	South East
I354	House	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	668m	East
I732	Parramatta Dam archaeological site weir	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	675m	South
I00750	Lennox Bridge	Item - General	State	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	691m	South
I336	Conjoined residences	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	705m	South East
I355	All Saints' Cemetery	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	708m	East
I376	Cottages	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	727m	North
A9	Archaeological and terrestrial	Item - Archaeological	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	729m	South
A10	Archaeological and terrestrial	Item - Archaeological	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	732m	South
A8	Archaeological and terrestrial	Item - Archaeological	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	735m	South
I551	All Saints Church	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	736m	South East
I377	Cottages	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	738m	North
I682	Shop	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	741m	South
I378	Timber cottage	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	749m	North
A7	Archaeological and terrestrial	Item - Archaeological	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	754m	South
I337	Single storey cottage	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	758m	South East
I681	Shop	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	762m	South
I469	All Saints Parochial Schools	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	764m	South East
I552	All Saints Hall	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	764m	South East
I680	Shop	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	766m	South

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Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
I00059	Parramatta hospital archaeological site	Item - General	State	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	770m	South
I374	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	771m	South East
I679	Shop	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	774m	South
I736	Former St Andrews Uniting Church, hall (and potential archaeological site)	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	775m	South
I397	Timber cottage	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	797m	South East
I330	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	799m	North East
I392	Fibro cottage	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	802m	North
I379	Iron Street Group	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	804m	North
I331	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	808m	North East
I398	Conjoined residences and potential archaeological site	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	809m	South East
I393	Victorian cottage	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	810m	North
I413	Bungalow	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	814m	East
I411	Californian bungalow	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	814m	East
I410	Semi-detached cottages	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	814m	East
I412	Bungalow	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	814m	East
I409	Timber cottage	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	815m	East
I408	Timber cottage	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	815m	East
I407	Cottage	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	816m	East
I676	Shop	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	819m	South
I406	Timber cottage	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	819m	East
I405	Timber cottage	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	820m	East
I356	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	823m	East
I675	Shop	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	823m	South

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Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
I399	Chivendon and potential archaeological site	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	823m	South East
I674	Shop	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	827m	South
I673	Shop	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	832m	South
I402	Timber cottages	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	832m	North
I671	Shop	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	835m	South
I470	Single storey residence and potential archaeological site	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	837m	South East
I357	Timber cottage	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	845m	East
I678	Former ANZ Bank (and potential archaeological site)	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	851m	South
I670	Shop, office (and potential archaeological site)	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	853m	South
I396		Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	860m	South East
I669	Shops (and potential archaeological site)	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	867m	South
I343	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	868m	East
I342	Timber cottage	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	869m	East
I401	Timber cottage	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	872m	North
I340	Hazelmere	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	873m	East
A13	Potential Archaeological Site	Item - Archaeological	Local	Parramatta Local Environmental Plan 2011	21/02/2020	21/02/2020	30/09/2021	876m	South
I668	Shop (and potential archaeological site)	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	884m	South
I737	Willow Grove (and potential archaeological site)	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	885m	South
I341	Single storey residence	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	888m	East
I672	Sandstone and brick wall	Item - General	Local	Parramatta Local Environmental Plan 2011	21/02/2020	21/02/2020	30/09/2021	889m	South
I667	Shop (and potential archaeological site)	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	889m	South
I677	Shop (and potential archaeological site)	Item - General	Local	Parramatta Local Environmental Plan 2011	21/02/2020	21/02/2020	30/09/2021	889m	South

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Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
I339	Ulvers Ilse	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	890m	East
I400	Timber cottage	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	893m	South East
I666	Shop (and potential archaeological site)	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	894m	South
I664	Shops and offices	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	900m	South
I394	Timber cottage	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	901m	North East
I663	Shop (and potential archaeological site)	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	910m	South
I699	Court house tower	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	912m	South
I403	Stone cottage	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	918m	North
I700	Former Rural Bank	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	929m	South
I662	Shop	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	930m	South
I661	Shop	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	939m	South
I404	Brick Cottage	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	943m	North
I660	Parramatta House (and potential archaeological site)	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	945m	South
I738	St Georges Terrace (and potential archaeological site)	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	948m	South
I459	Single storey cottage	Item - General	Local	Parramatta Local Environmental Plan 2011	21/02/2020	21/02/2020	30/09/2021	956m	South East
I665	Westpac Bank	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	967m	South
I701	Marsdens Building (and potential archaeological site)	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	976m	South
I702	Woolpack Hotel (and potential archaeological site)	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	983m	South
I338	Old Wesleyan Cemetery	Item - General	Local	Parramatta Local Environmental Plan 2011	07/10/2011	07/10/2011	30/09/2021	985m	South East
I704	Civic Arcade (former theatre) (and potential archaeological site)	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	987m	South
I659	Former courthouse wall and sandstone cellblock (and potential archaeological site)	Item - General	Local	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	996m	South

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Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
I00218	Redcoats Mess House (and potential archaeological site)	Item - General	State	Parramatta Local Environmental Plan 2011	18/12/2015	18/12/2015	30/09/2021	999m	South

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Natural Hazards

9 Albert Street, North Parramatta, NSW 2151

Bush Fire Prone Land

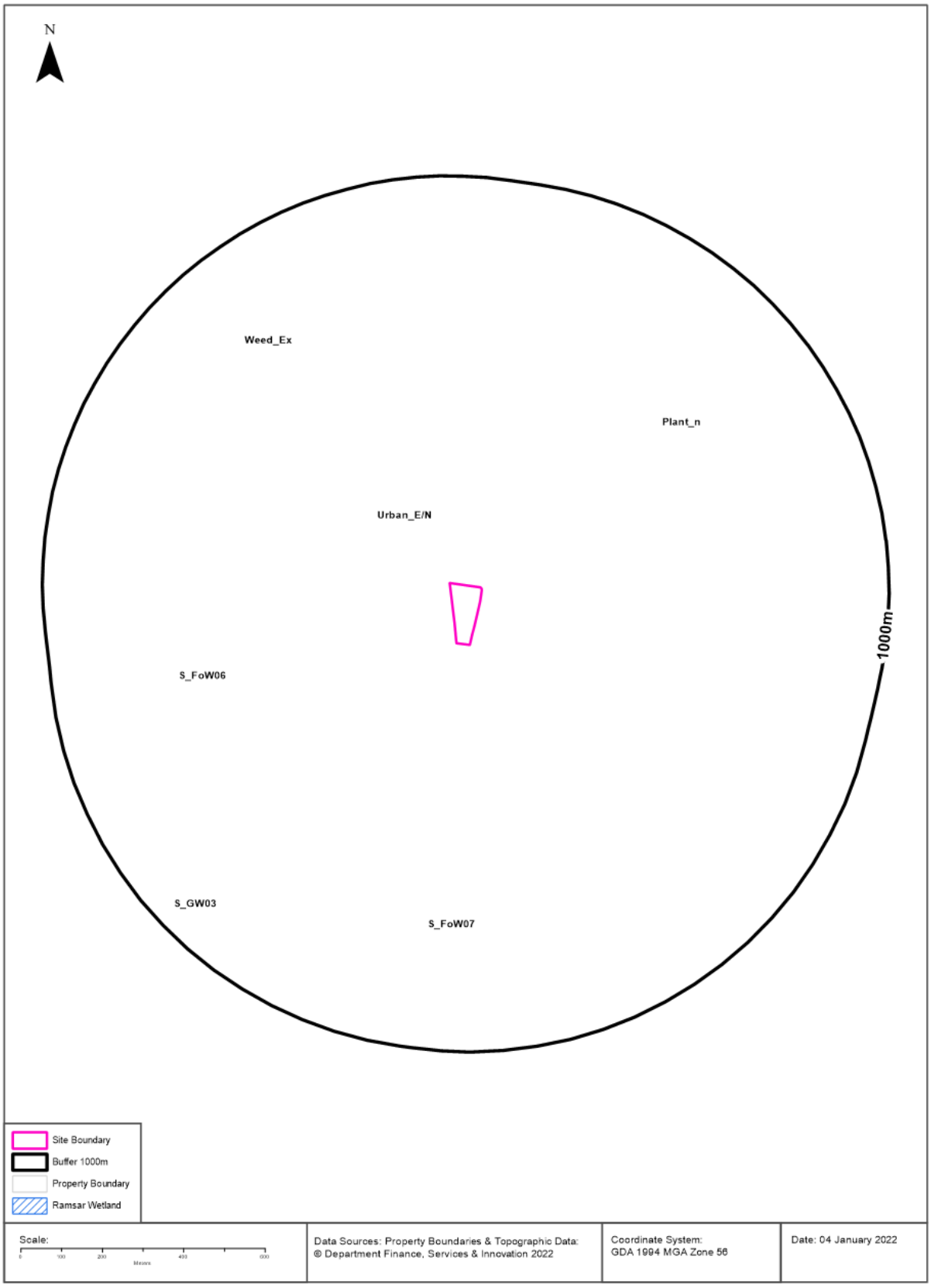
What are the nearest Bush Fire Prone Land Categories that exist within the dataset buffer?

Bush Fire Prone Land Category	Distance	Direction
No records in buffer		

NSW Bush Fire Prone Land - © NSW Rural Fire Service under Creative Commons 4.0 International Licence

Ecological Constraints - Vegetation & Ramsar Wetlands

9 Albert Street, North Parramatta, NSW 2151



Ecological Constraints

9 Albert Street, North Parramatta, NSW 2151

Native Vegetation

What native vegetation exists within the dataset buffer?

Map ID	Map Unit Name	Threatened Ecological Community NSW	Threatened Ecological Community EPBC Act	Understorey	Disturbance	Disturbance Index	Dominant Species	Dist	Dir
Weed_Ex	Weed_Ex: Weeds and Exotics			00: Not assessed	00: Not assessed	0: Not assessed	Exotic Species >90%cover	0m	On-site
Urban_E/N	Urban_E/N: Urban Exotic/Native			00: Not assessed	00: Not assessed	0: Not assessed	Urban Exotic/Native	87m	North East
S_FoW06	S_FoW06: Cumberland Riverflat Forest	River Flat Eucalypt Forest		20: Weeds and exotics	20: Previously cleared 1943	3: High	E.tereticornis/E.amplifolia/A.floribunda	213m	West
Plant_n	Plant_n: Plantation (native and/or exotic)			15: Grassy natives and exotics	20: Previously cleared 1943	3: High	Native or Exotic Plantations	240m	North East
S_FoW06	S_FoW06: Cumberland Riverflat Forest	River Flat Eucalypt Forest		15: Grassy natives and exotics	20: Previously cleared 1943	3: High	E.tereticornis/E.amplifolia/A.floribunda	277m	West
S_FoW07	S_FoW07: Cumberland Swamp Oak Riparian Forest	River Flat Eucalypt Forest		15: Grassy natives and exotics	20: Previously cleared 1943	3: High	C.glaucaEucalypts	364m	South West
Weed_Ex	Weed_Ex: Weeds and Exotics			00: Not assessed	20: Previously cleared 1943	3: High	Exotic Species >90%cover	525m	West
Plant_n	Plant_n: Plantation (native and/or exotic)			00: Not assessed	00: Not assessed	0: Not assessed	Native or Exotic Plantations	609m	South West
S_FoW07	S_FoW07: Cumberland Swamp Oak Riparian Forest	River Flat Eucalypt Forest		18: Swampy sedges, shrubs, ferns and herbs	13: Weeds	3: High	C.glaucaEucalypts	784m	South West
S_FoW06	S_FoW06: Cumberland Riverflat Forest	River Flat Eucalypt Forest		15: Grassy natives and exotics	19: Clearing/Part clearing	4: Very high	E.tereticornis/E.amplifolia/A.floribunda	794m	South
S_GW03	S_GW03: Cumberland Shale Plains Woodland	Cumberland Plain Woodland	Cumberland Plain Woodland/ Shale Gravel Forest (possible)	20: Weeds and exotics	20: Previously cleared 1943	3: High	E.tereticornis/E.moluccannaE.crebra/E.eugeinioides	857m	South West

Native Vegetation of the Sydney Metropolitan Area : NSW Office of Environment and Heritage
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Ramsar Wetlands

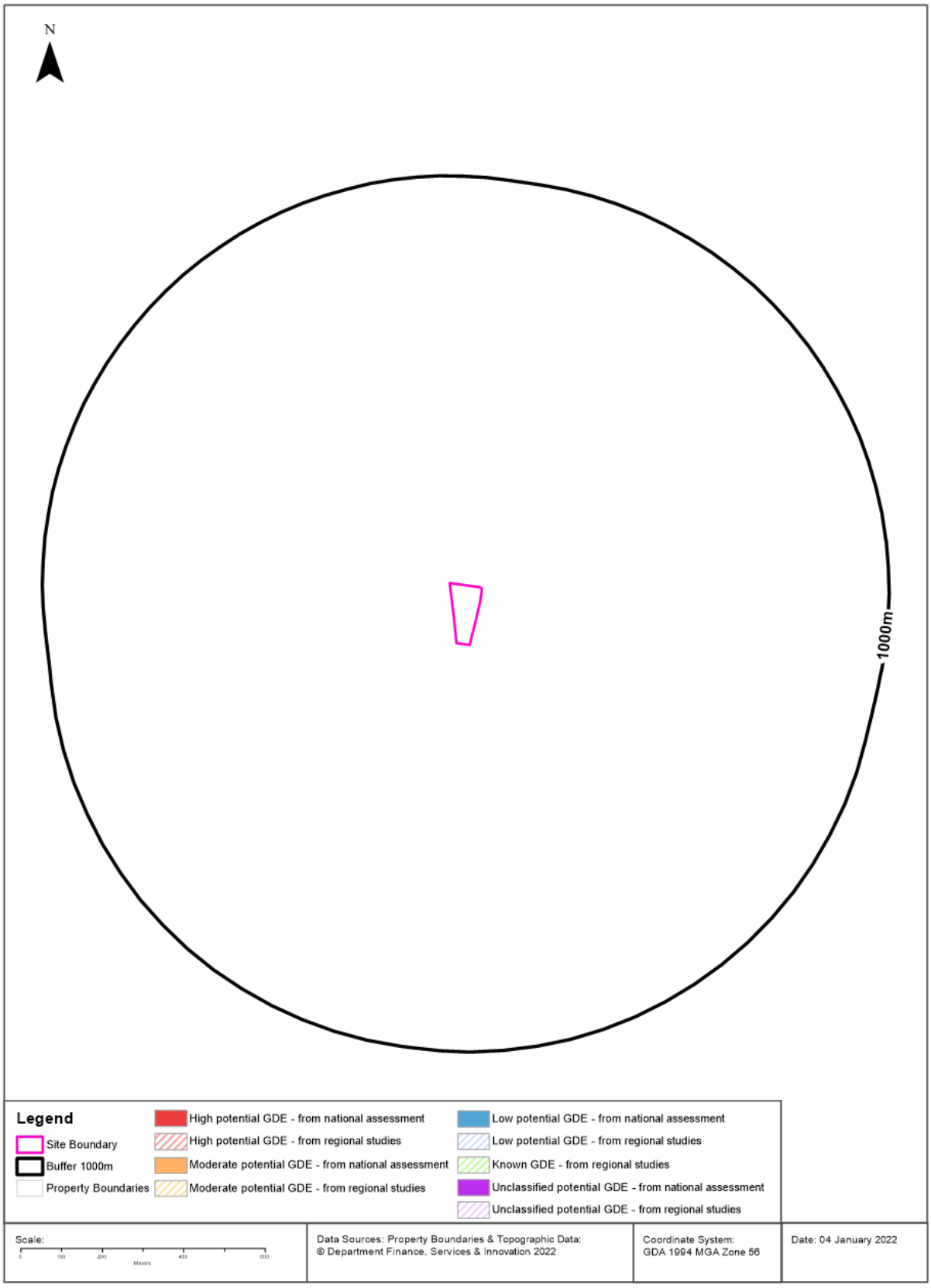
What Ramsar Wetland areas exist within the dataset buffer?

Map Id	Ramsar Name	Wetland Name	Designation Date	Source	Distance	Direction
N/A	No records in buffer					

Ramsar Wetlands Data Source: © Commonwealth of Australia - Department of Agriculture, Water and the Environment

Ecological Constraints - Groundwater Dependent Ecosystems Atlas

9 Albert Street, North Parramatta, NSW 2151



Ecological Constraints

9 Albert Street, North Parramatta, NSW 2151

Groundwater Dependent Ecosystems Atlas

Type	GDE Potential	Geomorphology	Ecosystem Type	Aquifer Geology	Distance	Direction
Terrestrial	High potential GDE - from national assessment	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	485m	West
Terrestrial	Low potential GDE - from national assessment	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	589m	West
Terrestrial	Moderate potential GDE - from national assessment	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	691m	West

Groundwater Dependent Ecosystems Atlas Data Source: The Bureau of Meteorology
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Ecological Constraints - Inflow Dependent Ecosystems Likelihood

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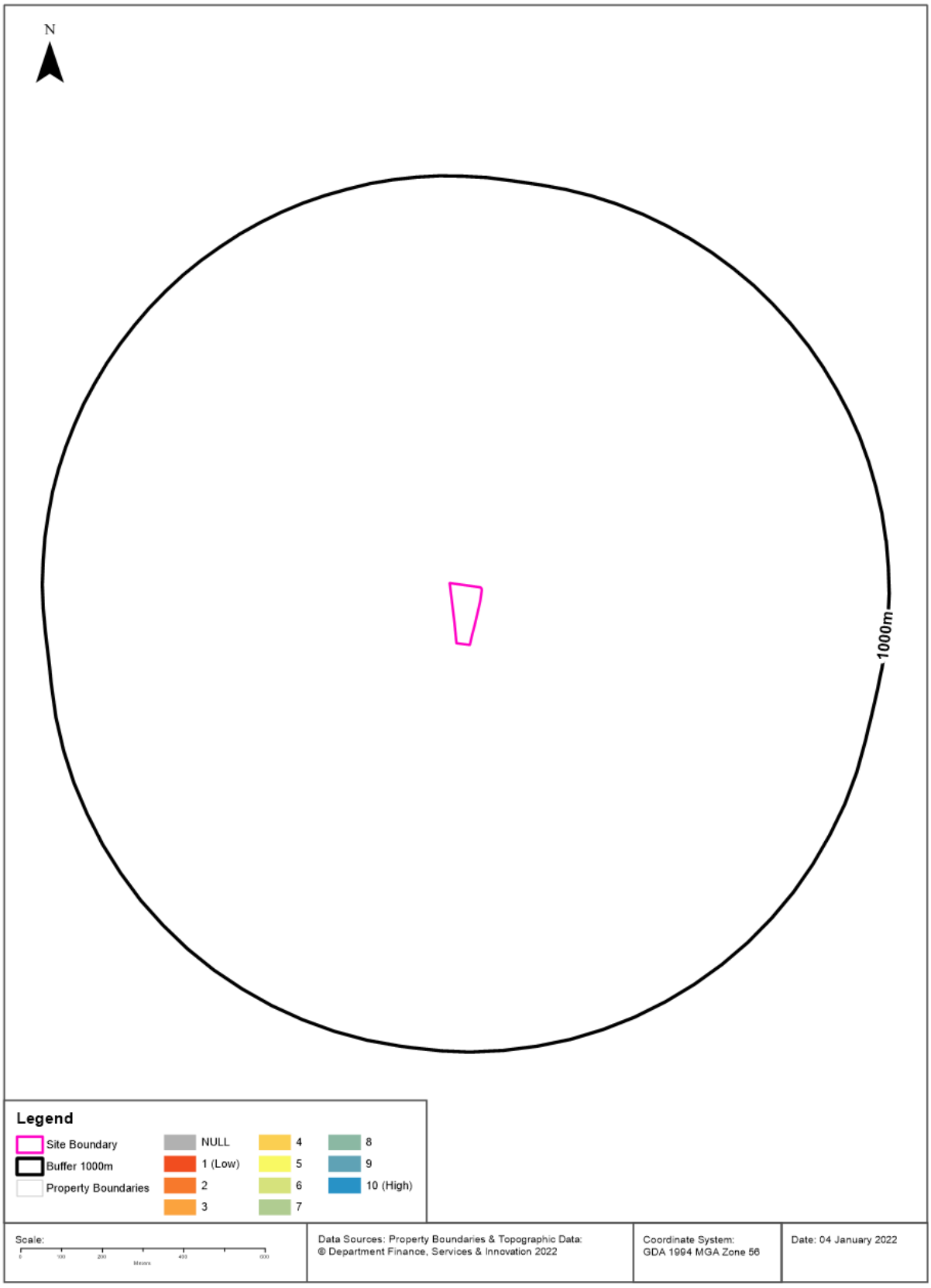

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Ecological Constraints

9 Albert Street, North Parramatta, NSW 2151

Inflow Dependent Ecosystems Likelihood

Type	IDE Likelihood	Geomorphology	Ecosystem Type	Aquifer Geology	Distance	Direction
Terrestrial	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	485m	West
Terrestrial	6	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	589m	West
Terrestrial	10	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	607m	West
Terrestrial	7	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	691m	West

Inflow Dependent Ecosystems Likelihood Data Source: The Bureau of Meteorology

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Ecological Constraints

9 Albert Street, North Parramatta, NSW 2151

NSW BioNet Atlas

Species on the NSW BioNet Atlas that have a NSW or federal conservation status, a NSW sensitivity status, or are listed under a migratory species agreement, and are within 10km of the site?

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Amphibia	Heleioporus australiacus	Giant Burrowing Frog	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Amphibia	Litoria aurea	Green and Golden Bell Frog	Endangered	Not Sensitive	Vulnerable	
Animalia	Amphibia	Pseudophryne australis	Red-crowned Toadlet	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Actitis hypoleucos	Common Sandpiper	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Anseranas semipalmata	Magpie Goose	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Anthochaera phrygia	Regent Honeyeater	Critically Endangered	Not Sensitive	Critically Endangered	
Animalia	Aves	Apus pacificus	Fork-tailed Swift	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Ardenna tenuirostris	Short-tailed Shearwater	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Arenaria interpres	Ruddy Turnstone	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Artamus cyanopterus cyanopterus	Dusky Woodswallow	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Botaurus poiciloptilus	Australasian Bittern	Endangered	Not Sensitive	Endangered	
Animalia	Aves	Burhinus grallarius	Bush Stone-curlew	Endangered	Not Sensitive	Not Listed	
Animalia	Aves	Calidris acuminata	Sharp-tailed Sandpiper	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Calidris alba	Sanderling	Vulnerable	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Calidris canutus	Red Knot	Not Listed	Not Sensitive	Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Calidris ferruginea	Curlew Sandpiper	Endangered	Not Sensitive	Critically Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Calidris melanotos	Pectoral Sandpiper	Not Listed	Not Sensitive	Not Listed	ROKAMBA;JAMBA
Animalia	Aves	Calidris ruficollis	Red-necked Stint	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Calidris tenuirostris	Great Knot	Vulnerable	Not Sensitive	Critically Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Callocephalon fimbriatum	Gang-gang Cockatoo	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Callocephalon fimbriatum	Gang-gang Cockatoo	Endangered Population, Vulnerable	Category 3	Not Listed	
Animalia	Aves	Calyptorhynchus banksii samueli	Red-tailed Black-Cockatoo (inland subspecies)	Vulnerable	Category 2	Not Listed	
Animalia	Aves	Calyptorhynchus lathami	Glossy Black-Cockatoo	Vulnerable	Category 2	Not Listed	
Animalia	Aves	Charadrius leschenaultii	Greater Sand-plover	Vulnerable	Not Sensitive	Vulnerable	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Chlidonias leucopterus	White-winged Black Tern	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Chthonicola sagittata	Speckled Warbler	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Circus assimilis	Spotted Harrier	Vulnerable	Not Sensitive	Not Listed	

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Aves	Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Cuculus optatus	Oriental Cuckoo	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Daphoenositta chrysoptera	Varied Sittella	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Epthianura albifrons	White-fronted Chat	Endangered Population, Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Falco hypoleucos	Grey Falcon	Endangered	Category 2	Not Listed	
Animalia	Aves	Falco subniger	Black Falcon	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Gallinago hardwickii	Latham's Snipe	Not Listed	Not Sensitive	Not Listed	ROKAMBA;JAMBA
Animalia	Aves	Gelochelidon nilotica	Gull-billed Tern	Not Listed	Not Sensitive	Not Listed	CAMBA
Animalia	Aves	Glossopsitta pusilla	Little Lorikeet	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Haliaeetus leucogaster	White-bellied Sea-Eagle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Hieraaetus morphnoides	Little Eagle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Hirundapus caudacutus	White-throated Needletail	Not Listed	Not Sensitive	Vulnerable	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Hydroprogne caspia	Caspian Tern	Not Listed	Not Sensitive	Not Listed	JAMBA
Animalia	Aves	Ixobrychus flavicollis	Black Bittern	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Lathamus discolor	Swift Parrot	Endangered	Category 3	Critically Endangered	
Animalia	Aves	Limicola falcinellus	Broad-billed Sandpiper	Vulnerable	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Limosa lapponica	Bar-tailed Godwit	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Limosa limosa	Black-tailed Godwit	Vulnerable	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Lophoictinia isura	Square-tailed Kite	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Motacilla flava	Yellow Wagtail	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Neophema pulchella	Turquoise Parrot	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Ninox connivens	Barking Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Ninox strenua	Powerful Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Numenius madagascariensis	Eastern Curlew	Not Listed	Not Sensitive	Critically Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Numenius phaeopus	Whimbrel	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Oxyura australis	Blue-billed Duck	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Pandion cristatus	Eastern Osprey	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Petroica boodang	Scarlet Robin	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Petroica phoenicea	Flame Robin	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Petroica rodinogaster	Pink Robin	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Philomachus pugnax	Ruff	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Pluvialis fulva	Pacific Golden Plover	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Pluvialis squatarola	Grey Plover	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA

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Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Aves	Polytelis swainsonii	Superb Parrot	Vulnerable	Category 3	Vulnerable	
Animalia	Aves	Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Ptilinopus superbus	Superb Fruit-Dove	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Rostratula australis	Australian Painted Snipe	Endangered	Not Sensitive	Endangered	
Animalia	Aves	Sterna hirundo	Common Tern	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Sternula albifrons	Little Tern	Endangered	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Stictonetta naevosa	Freckled Duck	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Thalasseus bergii	Crested Tern	Not Listed	Not Sensitive	Not Listed	JAMBA
Animalia	Aves	Tringa brevipes	Grey-tailed Tattler	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Tringa glareola	Wood Sandpiper	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Tringa nebularia	Common Greenshank	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Tringa stagnatilis	Marsh Sandpiper	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Tyto longimembris	Eastern Grass Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Tyto novaehollandiae	Masked Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Tyto tenebricosa	Sooty Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Xenus cinereus	Terek Sandpiper	Vulnerable	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Gastropoda	Meridolum corneovirens	Cumberland Plain Land Snail	Endangered	Not Sensitive	Not Listed	
Animalia	Gastropoda	Pommerhelix duralensis	Dural Land Snail	Endangered	Not Sensitive	Endangered	
Animalia	Mammalia	Cercartetus nanus	Eastern Pygmy-possum	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Chalinolobus dwyeri	Large-eared Pied Bat	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	Dasyurus maculatus	Spotted-tailed Quoll	Vulnerable	Not Sensitive	Endangered	
Animalia	Mammalia	Falsistrellus tasmaniensis	Eastern False Pipistrelle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Miniopterus australis	Little Bent-winged Bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Miniopterus orianae oceanensis	Large Bent-winged Bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Myotis macropus	Southern Myotis	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Petauroides volans	Greater Glider	Not Listed	Not Sensitive	Vulnerable	
Animalia	Mammalia	Petaurus norfolcensis	Squirrel Glider	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Phascogale tapoatafa	Brush-tailed Phascogale	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Phascolarctos cinereus	Koala	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Scoteanax rueppellii	Greater Broad-nosed Bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Vespadelus troughtoni	Eastern Cave Bat	Vulnerable	Not Sensitive	Not Listed	

Lotsearch Pty Ltd ABN 89 600 168 018

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Reptilia	Aspidites ramsayi	Woma	Vulnerable	Not Sensitive	Not Listed	
Animalia	Reptilia	Caretta caretta	Loggerhead Turtle	Endangered	Not Sensitive	Endangered	
Animalia	Reptilia	Chelonia mydas	Green Turtle	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Reptilia	Tiliqua occipitalis	Western Blue-tongued Lizard	Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Acacia bakeri	Marblewood	Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Acacia bynoeana	Bynoe's Wattle	Endangered	Not Sensitive	Vulnerable	
Plantae	Flora	Acacia cluniesrossiae	Kanangra Wattle	Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Acacia pubescens	Downy Wattle	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Argyrotegium nitidulum	Shining Cudweed	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Callistemon linearifolius	Netted Bottle Brush	Vulnerable	Category 3	Not Listed	
Plantae	Flora	Darwinia biflora		Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Darwinia peduncularis		Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Dillwynia tenuifolia		Endangered Population, Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Dillwynia tenuifolia		Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Epacris purpurascens var. purpurascens		Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Eucalyptus leucoxylon subsp. pruinosa	Yellow Gum	Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Eucalyptus nicholii	Narrow-leaved Black Peppermint	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Eucalyptus scoparia	Wallangarra White Gum	Endangered	Not Sensitive	Vulnerable	
Plantae	Flora	Genoplesium baueri	Bauer's Midge Orchid	Endangered	Category 2	Endangered	
Plantae	Flora	Grammitis stenophylla	Narrow-leaf Finger Fern	Endangered	Category 3	Not Listed	
Plantae	Flora	Grevillea beadleana	Beadle's Grevillea	Endangered	Category 3	Endangered	
Plantae	Flora	Hibbertia superans		Endangered	Not Sensitive	Not Listed	
Plantae	Flora	Isotoma fluviatilis subsp. fluviatilis		Not Listed	Not Sensitive	Extinct	
Plantae	Flora	Leptospermum deanei		Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Macadamia integrifolia	Macadamia Nut	Not Listed	Not Sensitive	Vulnerable	
Plantae	Flora	Macadamia tetraphylla	Rough-shelled Bush Nut	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Marsdenia viridiflora subsp. viridiflora	Native Pear	Endangered Population	Not Sensitive	Not Listed	
Plantae	Flora	Melaleuca deanei	Deane's Paperbark	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Persoonia hirsuta	Hairy Geebung	Endangered	Category 3	Endangered	
Plantae	Flora	Persoonia nutans	Nodding Geebung	Endangered	Not Sensitive	Endangered	
Plantae	Flora	Pimelea curviflora var. curviflora		Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Pimelea spicata	Spiked Rice-flower	Endangered	Not Sensitive	Endangered	
Plantae	Flora	Pomaderris prunifolia	Plum-leaf Pomaderris	Endangered Population	Not Sensitive	Not Listed	

Lotsearch Pty Ltd ABN 89 600 168 018

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Plantae	Flora	Pterostylis gibbosa	Illawarra Greenhood	Endangered	Category 2	Endangered	
Plantae	Flora	Pterostylis saxicola	Sydney Plains Greenhood	Endangered	Category 2	Endangered	
Plantae	Flora	Pultenaea parviflora		Endangered	Not Sensitive	Vulnerable	
Plantae	Flora	Pultenaea pedunculata	Matted Bush-pea	Endangered	Not Sensitive	Not Listed	
Plantae	Flora	Rhodamnia rubescens	Scrub Turpentine	Critically Endangered	Not Sensitive	Critically Endangered	
Plantae	Flora	Senecio behrianus		Extinct	Not Sensitive	Endangered	
Plantae	Flora	Syzygium paniculatum	Magenta Lilly Pilly	Endangered	Not Sensitive	Vulnerable	
Plantae	Flora	Tetratheca glandulosa		Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Triplarina imbricata	Creek Triplarina	Endangered	Not Sensitive	Endangered	
Plantae	Flora	Wahlenbergia multicaulis	Tadgell's Bluebell	Endangered Population	Not Sensitive	Not Listed	
Plantae	Flora	Wilsonia backhousei	Narrow-leafed Wilsonia	Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Zannichellia palustris		Endangered	Not Sensitive	Not Listed	

Data does not include NSW category 1 sensitive species.
NSW BioNet: © State of NSW and Office of Environment and Heritage

Location Confidences

Where Lotsearch has had to georeference features from supplied addresses, a location confidence has been assigned to the data record. This indicates a confidence to the positional accuracy of the feature. Where applicable, a code is given under the field heading "LC" or "LocConf". These codes lookup to the following location confidences:

LC Code	Location Confidence
Premise Match	Georeferenced to the site location / premise or part of site
Area Match	Georeferenced to an approximate or general area
Road Match	Georeferenced to a road or rail corridor
Road Intersection	Georeferenced to a road intersection
Buffered Point	A point feature buffered to x metres
Adjacent Match	Land adjacent to a georeferenced feature
Network of Features	Georeferenced to a network of features
Suburb Match	Georeferenced to a suburb boundary
As Supplied	Spatial data supplied by provider

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Appendix I – Council Search

CITY OF PARRAMATTA

City of Parramatta Archives

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Title: Valuation List, Parramatta City Council: Ada-Argyle

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City of Parramatta

Parramatta Heritage and Visitor Information Centre
346A Church Street, Parramatta NSW 2150

PO Box 32, Parramatta, NSW 2124
historyandheritage.cityofparramatta.nsw.gov.au/

EM

DEPARTMENT OF THE VALUER GENERAL, N.S.W.—VALUATION LIST.

VALUATION DISTRICT OF: 133 PARRAMATTA — WARD OR RIDING: — VALUATION No.: 136

OWNER'S NAME	OCCUPATION	ADDRESS
Education Department		C/O Resumed Properties Department, 16 Grosvenor St., Sydney.

LESSEE'S NAME:

COUNTY: Cumberland — PARISH: Field of Mars. — TOWN OR VILLAGE: Parramatta.

REGD. REF. TO TITLE: Vo. / Bk. — Fo. / No. — D.P. — OTHER TENURE — NATURE OF IMPROVEMENTS: Fencing Ground Impts. — LOCALITY OR ESTATE — HOUSE No. OR NAME

STREET: Albert — SIDE: S

DATE VALUES TAKE EFFECT IN VALUATION ROLL	PORTION.	SEC.	LOT.	AREA OR DIMENSIONS.	VALUES. UNIMPROVED. £	VALUES. IMPROVED. £	VALUES. ASSESSED ANNUAL. £	REMARKS.
10.5.45		84	1	280'10x536'6 / 99'x553'2 (2a.1r.7 19/40)	1635	1775	89	

	1946	1947	1948
GEN. RATE	No Value	Exempt	Exempt
ARREARS			
EXTRA CHGS.			
TRACING ,,			
TOTAL £			

St 400—3

CITY OF PARRAMATTA

City of Parramatta Archives

These pages are copied from

Series number: PRS11

Object number: PRS11/094

Title: Valuation List, Parramatta City Council: Ada-Anderson

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City of Parramatta

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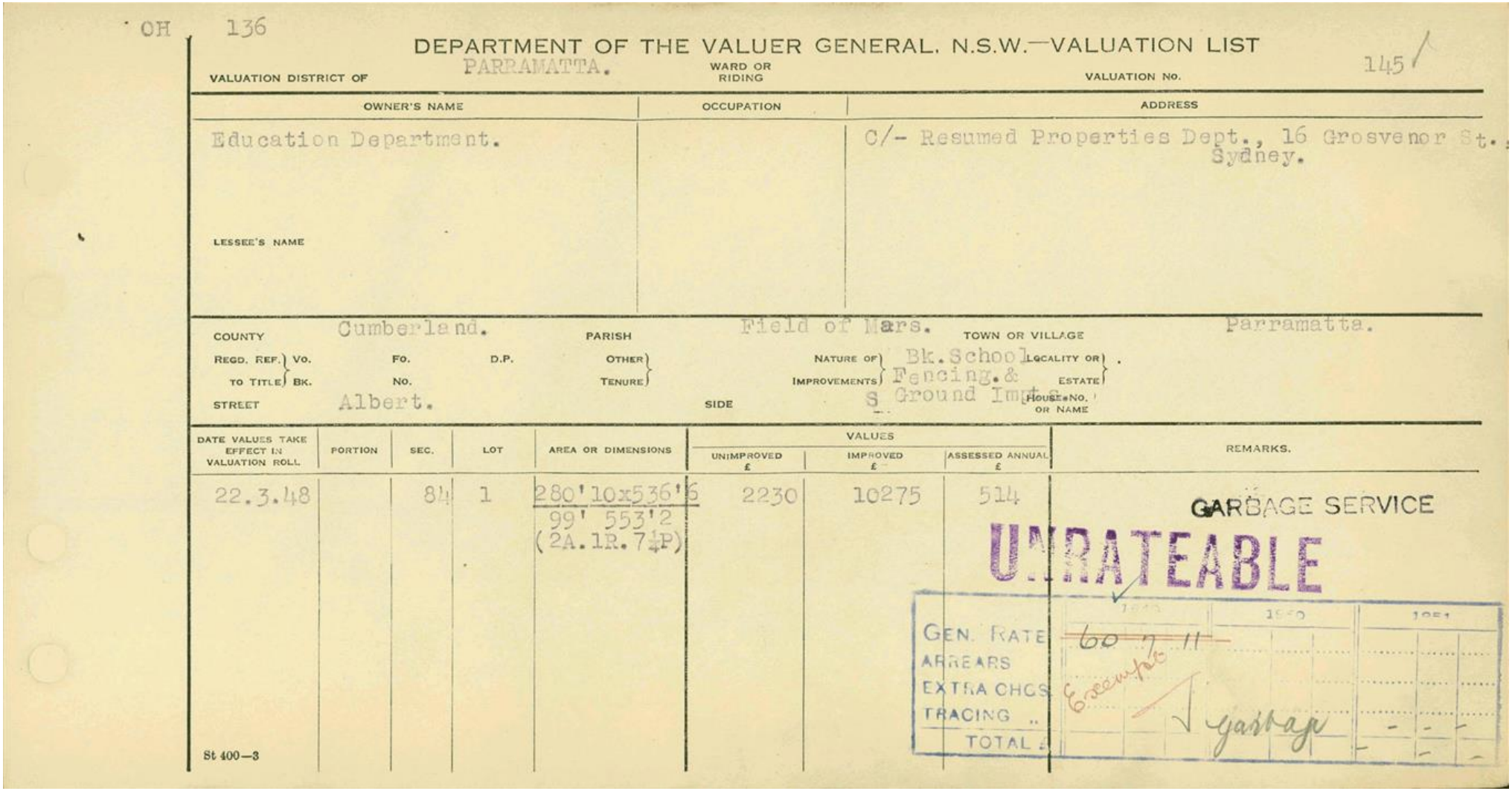
346A Church Street, Parramatta NSW 2150

PO Box 32, Parramatta, NSW 2124
historyandheritage.cityofparramatta.nsw.gov.au/



OH 136

DEPARTMENT OF THE VALUER GENERAL. N.S.W.—VALUATION LIST

VALUATION DISTRICT OF PARRAMATTA. WARD OR RIDING VALUATION No. 145

OWNER'S NAME	OCCUPATION	ADDRESS
Education Department.		C/- Resumed Properties Dept., 16 Grosvenor St., Sydney.
LESSEE'S NAME		

COUNTY Cumberland. PARISH Field of Mars. TOWN OR VILLAGE Parramatta.

REGD. REF. TO TITLE Vo. Bk. Fo. No. D.P. OTHER TENURE NATURE OF IMPROVEMENTS Bk. School Fencing. & Ground Impts. LOCALITY OR ESTATE

STREET Albert. SIDE S HOUSE NO. OR NAME

DATE VALUES TAKE EFFECT IN VALUATION ROLL	PORTION	SEC.	LOT	AREA OR DIMENSIONS	VALUES UNIMPROVED £	IMPROVED £	ASSESSED ANNUAL £	REMARKS.
22.3.48		84	1	280'10x536'6 / 99' 553'2 (2A.1R.7¼P)	2230	10275	514	GARBAGE SERVICE

UNRATEABLE

	1949	1950	1951
GEN. RATE	~~60 7 11~~		
ARREARS			
EXTRA CHGS	Exempt		
TRACING ..			
TOTAL £			

√ garbage

St 400—3

Appendix J – Chain of Custody Forms and Sample Receipt Advices

Sheet 1 of 1

Site: 9 Albert St & 31 O'Connell St North Parramatta

Project No: E25473

Laboratory: Envirolab Services, 12 Ashley Street, CHATSWOOD NSW 2067, P: 02 9910 6200

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	SOIL	WATER	0.45 µm field filtered	OTHER	HM [A] /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM [A] /TRH/BTEX/PAHs	HM [A] /TRH/BTEX	BTEX	VOCs	Asbestos	Asbestos Quantification	Excavated Natural Material (ENM) Suite	Dewatering Suite	pH / pH peroxide	sPOCAS	Chromium Reducible Sulfur (CrS)	PFAS	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	Sulphate / Chloride			TCLP HM [B] / PAH	Comments
QTI	1	J	22/3/22	AM/PM	✓						✓																	HM [A] Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc; HM [B] Arsenic, Cadmium, Chromium, Lead, Mercury, Nickel
																												Dewatering Suite: pH & EC, TDS / TDU, Hardness, Total Cyanide, Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn), TRH (F1, F2, F3, F4), BTEX, PAH

Envirolab Services, 12 Ashley St, Chatswood NSW 2067, Ph: (02) 9910 6200

Job No: 291835

Date Received: 25/3

Time Received: 9:15

Received by: JT

Temp: Cool/Ambient

Cooling: Ice/Icepack

Security: Intact/Broken/None

LABORATORY TURNAROUND

- ☒ Standard
- ☐ 24 Hours
- ☐ 48 Hours
- ☐ 72 Hours
- ☐ Other____

Container Type:
J = solvent washed, acid rinsed, Teflon sealed glass jar
S = solvent washed, acid rinsed glass bottle
P = natural HDPE plastic bottle
VC = glass vial, Teflon Septum
ZLB = Zip-Lock Bag

eiaustralia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street, PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au

COC June 2021 FORM v 5 - Envirolab

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Sampler's Name (EI): Andrew Schmidt

Print: Andrew Schmidt

Signature:

Date: 22/3/2022.

Received by (Envirolab):

Print: JITVST

Signature:

Date: 25/3

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

Report with EI Waste Classification Table ☐

Sampler's Comments:

Sheet 1 of 5

Site:	Project No:
9 Albert St & 30 Comett St, North Parramatta	E25473

Laboratory:	SGS Australia Unit 16, 33 Maddox Street, ALEXANDRIA NSW 2015 P: 02 8594 0400 F: 02 8594 0499

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	Sample Matrix: SOIL	WATER	0.45 µm field filtered	OTHER	Analysis: HM [A] /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM [A] /TRH/BTEX/PAHs	HM [A] /TRH/BTEX	BTEX	VOCs /phenolic compounds	Asbestos	Asbestos Quantification	Excavated Natural Material (ENM) Suite	ENM Suite - Stockpile discrete (TRH/BTEX/PAHs)	ENM Suite - Stockpile composite (HM [A] /pH / EC / Foreign Materials)	Dewatering Suite	pH / pH peroxide	sPOCAS	Chromium Reducible Sulfur (CrS)	PFAS	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	Sulphate / Chloride	Lead	TCLP HM [B] / PAH	Comments
BH1_0.1-0.2		S,ZLB	22/3/22	am/pm	X				X																				
_0.9-1.0		↓	↓	↓	↓																								
_1.5-1.6										X																			
BH2M_0.4-0.5									X				X																
_0.9-1.0																													
BH3_0.2-0.3									X																				
_1.0-1.1																													
BH4_0.2-0.3																													
_0.7-0.8									X				X																
_1.3-1.4										X																			
BH5_0.4-0.5									X				X																
_0.9-1.0		↓	↓	↓	↓				X																				

Comments

HM [A]
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Zinc

HM [B]
Arsenic
Cadmium
Chromium
Lead
Mercury
Nickel

Dewatering Suite
pH & EC
TDS / TDU
Hardness
Total Cyanide
Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
TRH (F1, F2, F3, F4)
BTEX
PAH
Total Phenol

LABORATORY TURNAROUND

- [X] Standard
- [ ] 24 Hours
- [ ] 48 Hours
- [ ] 72 Hours
- [ ] Other____

Container Type:
J = solvent washed, acid rinsed, Teflon sealed glass jar
S = solvent washed, acid rinsed glass bottle
P = natural HDPE plastic bottle
VC = glass vial, Teflon Septum
ZLB = Zip-Lock Bag BB = Bulk Bag

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Report with EI Waste Classification Table [X]

Sampler's Name (EI):	Received by (SGS):
Print: Andrew Schmidt	Print:
Signature:	Signature:
Date: 22/3/22	Date:

Sampler's Comments:
cc: Micaela.Green
Please Fwd: QTI to Envirolab

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

eiaustralia
Suite 6.01, 55 Miller Street,
PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au

COC June 2021 FORM v5 - SGS

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details	
Client	EI Australia
Attention	Micaela Green

Sample Login Details	
Your reference	E25473, 9 Albert St & 31 O'Connell St North Parram
Envirolab Reference	291835
Date Sample Received	25/03/2022
Date Instructions Received	25/03/2022
Date Results Expected to be Reported	01/04/2022

Sample Condition	
Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	1 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	5
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments
Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

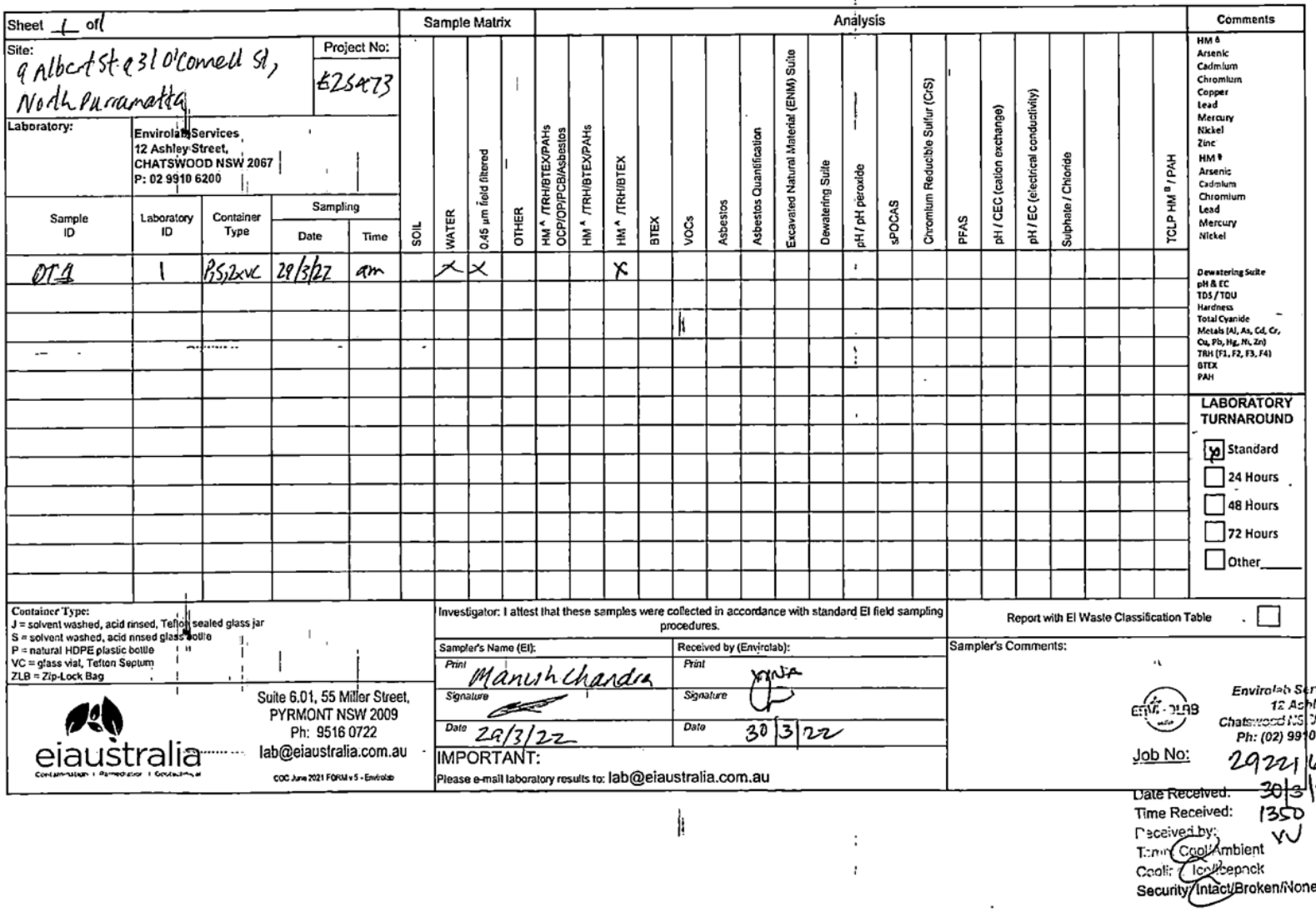
Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	Acid Extractable metalsin soil
QT1	✓	✓	✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info
Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.



Sheet 1 of 1

Site: 9 Albert St & 31 O'Connell St, North Parramatta

Project No: E25473

Laboratory: Envirolab Services, 12 Ashley Street, CHATSWOOD NSW 2067, P: 02 9910 6200

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	SOIL	WATER	0.45 µm field filtered	OTHER	HM [A] /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM [A] /TRH/BTEX/PAHs	HM [A] /TRH/BTEX	BTEX	VOCs	Asbestos	Asbestos Quantification	Excavated Natural Material (ENM) Suite	Dewatering Suite	pH / pH peroxide	sPOCAS	Chromium Reducible Sulfur (CrS)	PFAS	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	Sulphate / Chloride			TCLP HM [B] / PAH
QT1	1	P/S/ZxVC	29/3/22	am		X	X				X																

Comments:

HM [A]: Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc

HM [B]: Arsenic, Cadmium, Chromium, Lead, Mercury, Nickel

Dewatering Suite: pH & EC, TDS / TDU, Hardness, Total Cyanide, Metals [Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn], TRH [F1, F2, F3, F4], BTEX, PAH

LABORATORY TURNAROUND

- [x] Standard
- [ ] 24 Hours
- [ ] 48 Hours
- [ ] 72 Hours
- [ ] Other____

Container Type:
J = solvent washed, acid rinsed, Teflon sealed glass jar
S = solvent washed, acid rinsed glass bottle
P = natural HDPE plastic bottle
VC = glass vial, Teflon Septum
ZLB = Zip-Lock Bag

eiaustralia
Suite 6.01, 55 Miller Street, PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au
COC June 2021 FORM v 5 - Envirolab

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Sampler's Name (EI): Print: Manish Chandra
Signature:
Date: 29/3/22

Received by (Envirolab): Print: [illegible]
Signature:
Date: 30/3/22

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

Report with EI Waste Classification Table ☐

Sampler's Comments:

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 292216
Date Received: 30/3/22
Time Received: 1350
Received by: VJ
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Sheet 1 of 1

Site: 9 Albert St & 310 Connell St, North Parramatta

Project No: E25473

Laboratory: SGS Australia
Unit 16, 33 Maddox Street,
ALEXANDRIA NSW 2015
P: 02 8594 0400 F: 02 8594 0499

Sample Matrix: SOIL | WATER | 0.45 µm field filtered | OTHER

Analysis: HM ^ /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos | HM ^ /TRH/BTEX/PAHs | HM ^ /TRH/BTEX | pH | VOCs /phenols | Asbestos | Asbestos Quantification | Excavated Natural Material (ENM) Suite | Dewatering Suite | pH / pH peroxide | sPOCAS | Chromium Reducible Sulfur (CrS) | PFAS | pH / CEC (cation exchange) | pH / EC (electrical conductivity) | Sulphate / Chloride | ON HOLD | | TCLP HM [9] / PAH

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	SOIL	WATER	0.45 µm field filtered	OTHER	HM ^ /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM ^ /TRH/BTEX/PAHs	HM ^ /TRH/BTEX	pH	VOCs /phenols	Asbestos	Asbestos Quantification	Excavated Natural Material (ENM) Suite	Dewatering Suite	pH / pH peroxide	sPOCAS	Chromium Reducible Sulfur (CrS)	PFAS	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	Sulphate / Chloride	ON HOLD		TCLP HM [9] / PAH
GW-BH2M-1		P/S/VC	22/3/22	am		X	X			X		X	X														
GW-BH18M-1		↓	↓	↓		↓	↓			X		X	X														
GW-BH20M-1										X		X	X														
QD1							↓				X																
QR1											X																
QRB1		↓	↓	↓																							
OTB1		VC	lab prepared			↓						X												X			
OT81		VC										X															

Comments:
HM 8
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Zinc
HM 8
Arsenic
Cadmium
Chromium
Lead
Mercury
Nickel
Dewatering Suite
pH & EC
TDS / TDU
Hardness
Total Cyanide
Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
TRH (F1, F2, F3, F4)
BTEX
PAH

LABORATORY TURNAROUND
- [x] Standard
- [ ] 24 Hours
- [ ] 48 Hours
- [ ] 72 Hours
- [ ] Other____

Container Type:
J = solvent washed, acid rinsed, Teflon seated glass jar
S = solvent washed, acid rinsed glass bottle
P = natural HDPE plastic bottle
VC = glass vial, Teflon Septum
ZLB = Zip-Lock Bag

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Sampler's Name (EI): Print Manish Chandra
Signature
Date 29/3/22

Received by (SGS): Print / Signature / Date

Report with EI Waste Classification Table ☐

Sampler's Comments: Please forward OTB to Envirolab

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

eiaustralia
Contamination | Remediation | Geotechnical

Suite 6.01, 55 Miller Street,
PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au

COC June 2021 FORM v3 - SGS

292216 Q.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details	
Client	EI Australia
Attention	Lab Email

Sample Login Details	
Your reference	E25473, 9 Albert St & 31 O'Connell St North Parram
Envirolab Reference	292216
Date Sample Received	30/03/2022
Date Instructions Received	30/03/2022
Date Results Expected to be Reported	06/04/2022

Sample Condition	
Samples received in appropriate condition for analysis	
No. of Samples Provided	1 Water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	15
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments
Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	vTRH(C6-C10)/BTEXN in Water	svTRH (C10-C40) in Water	HM in water - dissolved
QT1	✓	✓	✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info
Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

E-MAILED
23/3 @ 4.42pm

Sheet 1 of 5

Site: 9 Albert St & 10 Comett St, North Parramatta
Project No: E25473

Laboratory: SGS Australia
Unit 16, 33 Maddox Street,
ALEXANDRIA NSW 2015
P: 02 8594 0400 F: 02 8594 0499

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	Sample Matrix: SOIL	WATER	0.45 µm field filtered	OTHER	Analysis: HM [A] /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM [A] /TRH/BTEX/PAHs	HM [A] /TRH/BTEX	BTEX	VOCs /phenolic compounds	Asbestos	Asbestos Quantification	Excavated Natural Material (ENM) Suite	ENM Suite - Stockpile discrete (TRH/BTEX/PAHs)	ENM Suite - Stockpile composite (HM [A] /pH / EC / Foreign Materials)	Dewatering Suite	pH / pH peroxide	sPOCAS	Chromium Reducible Sulfur (CrS)	PFAS	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	Sulphate / Chloride	Lead	TCLP HM [B] / PAH
BH1_0.1-0.2	1	S,ZLB	22/3/22	am/pm	X				X																		
_0.9-1.0																											
_1.5-1.6	2									X																	
BH2M_0.4-0.5	3								X				X														
_0.9-1.0																											
BH3_0.2-0.3	4								X																		
_1.0-1.1																											
BH4_0.2-0.3																											
_0.7-0.8	5								X				X														
_1.3-1.4	6									X																	
BH5_0.4-0.5	7								X				X														
_0.9-1.0	8								X																		

SGS EHS Sydney COC
SE230272

Comments:
HM [A]
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Zinc

HM [B]
Arsenic
Cadmium
Chromium
Lead
Mercury
Nickel

Dewatering Suite
pH & EC
TDS / TDU
Hardness
Total Cyanide
Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
TRH (F1, F2, F3, F4)
BTEX
PAH
Total Phenol

LABORATORY TURNAROUND
- [x] Standard
- [ ] 24 Hours
- [ ] 48 Hours
- [ ] 72 Hours
- [ ] Other ____

Container Type:
J = solvent washed, acid rinsed, Teflon sealed glass jar
S = solvent washed, acid rinsed glass bottle
P = natural HDPE plastic bottle
VC = glass vial, Teflon Septum
ZLB = Zip-Lock Bag BB = Bulk Bag

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Report with EI Waste Classification Table [x]

Sampler's Name (EI):	Received by (SGS):
Print: Andrew Schmidt	Print: George Zhi
Signature: A.Sch	Signature:
Date: 22/3/22	Date: 22/3/22 @ 3pm

Sampler's Comments:
cc: Micaela.Green
Please find: QT1 to Envirolab

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

eiaustralia
Suite 6.01, 55 Miller Street,
PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au

COC June 2021 FORM v5 - SGS

Sheet 2 of 5

Site: 9 Albert St & 30 Comati St, North Parramatta

Project No: E25473

Laboratory: SGS Australia
Unit 16, 33 Maddox Street,
ALEXANDRIA NSW 2015
P: 02 8594 0400 F: 02 8594 0499

Sample Matrix: SOIL | WATER | 0.45 µm field filtered | OTHER

Analysis: HM ^ /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos | HM ^ /TRH/BTEX/PAHs | HM ^ /TRH/BTEX | BTEX | VOCs /phenolic compounds | Asbestos /ACD/FAPP | Asbestos Quantification | Excavated Natural Material (ENM) Suite | ENM Suite - Stockpile discrete (TRH/BTEX/PAHs) | ENM Suite - Stockpile composite (HM ^ /pH / EC / Foreign Materials) | Dewatering Suite | pH / pH peroxide | sPOCAS | Chromium Reducible Sulfur (CrS) | PFAS | pH / CEC (cation exchange) | pH / EC (electrical conductivity) | Sulphate / Chloride | Lead | TCLP HM [B] / PAH

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	SOIL	WATER	0.45 µm field filtered	OTHER	HM ^ /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM ^ /TRH/BTEX/PAHs	HM ^ /TRH/BTEX	BTEX	VOCs /phenolic compounds	Asbestos /ACD/FAPP	Asbestos Quantification	Excavated Natural Material (ENM) Suite	ENM Suite - Stockpile discrete (TRH/BTEX/PAHs)	ENM Suite - Stockpile composite (HM ^ /pH / EC / Foreign Materials)	Dewatering Suite	pH / pH peroxide	sPOCAS	Chromium Reducible Sulfur (CrS)	PFAS	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	Sulphate / Chloride	Lead	TCLP HM [B] / PAH
BH5_1.4-1.5	9	S,ZLB	22/3/22	am/pm	X					X																		
BH6_0.2-0.3	10								X																			
_1.0-1.1																												
BH7_0.5-0.6	11									X				X														
BH8_0.1-0.2	12								X				X															
_0.8-0.9																												
BH9_0.2-0.3																												
_0.7-0.8	13								X																			
_1.4-1.5	14									X																		
BH10_0.05-0.1	15								X																			
_0.5-0.6																												
BH11_0.05-0.1	16								X																			

Comments:
HM [B]
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Zinc

HM [B]
Arsenic
Cadmium
Chromium
Lead
Mercury
Nickel

Dewatering Suite
pH & EC
TDS / TDU
Hardness
Total Cyanide
Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
TRH (F1, F2, F3, F4)
BTEX
PAH
Total Phenol

LABORATORY TURNAROUND
- [x] Standard
- [ ] 24 Hours
- [ ] 48 Hours
- [ ] 72 Hours
- [ ] Other _____

Container Type:
J = solvent washed, acid rinsed, Teflon sealed glass jar
S = solvent washed, acid rinsed glass bottle
P = natural HDPE plastic bottle
VC = glass vial, Teflon Septum
ZLB = Zip-Lock Bag BB = Bulk Bag

eiaustralia
Suite 6.01, 55 Miller Street,
PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au
COC June 2021 FORM v5 - SGS

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Sampler's Name (EI):
Print: Andrew Schmidt
Signature:
Date: 22/3/22

Received by (SGS):
Print: George Zhi
Signature:
Date: 22/3/22 @ 3pm

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

Report with EI Waste Classification Table [x]

Sampler's Comments:
cc: Micaela.Green
Please find: QT1 to Envirolab

Sheet 3 of 5

Site: 9 Albert St & 310 Connell St, North Parramatta

Project No: E25473

Laboratory: SGS Australia
Unit 16, 33 Maddox Street,
ALEXANDRIA NSW 2015
P: 02 8594 0400 F: 02 8594 0499

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	Sample Matrix: SOIL	WATER	0.45 µm field filtered	OTHER	Analysis: HM [A] /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM [A] /TRH/BTEX/PAHs	HM [A] /TRH/BTEX	BTEX	VOCs (phenolic compounds)	Asbestos	Asbestos Quantification	Excavated Natural Material (ENM) Suite	ENM Suite - Stockpile discrete (TRH/BTEX/PAHs)	ENM Suite - Stockpile composite (HM [A] /pH / EC / Foreign Materials)	Dewatering Suite	pH / pH peroxide	sPOCAS	Chromium Reducible Sulfur (CrS)	PFAS	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	Sulphate / Chloride	Lead	TCLP HM [B] / PAH	Comments
BH11_0.6-0.7		J,ZLB	22/3/22	am/pm	X																							
BH12_0.1-0.2	17								X				X															
_0.4-0.5																												
BH13_0.2-0.3	18								X				X															
_0.6-0.7	19									X																		
BH14_0.1-0.2	20								X				X															
_0.5-0.6																												
BH15_0.2-0.3	21								X				X															
_0.7-0.8	22									X																		
BH16_0.1-0.2	23								X				X															
_0.5-0.6																												
BH17_0.2-0.3	24								X																			

Comments

HM [A]
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Zinc

HM [B]
Arsenic
Cadmium
Chromium
Lead
Mercury
Nickel

Dewatering Suite
pH & EC
TDS / TDU
Hardness
Total Cyanide
Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
TRH (F1, F2, F3, F4)
BTEX
PAH
Total Phenol

LABORATORY TURNAROUND

- [X] Standard
- [ ] 24 Hours
- [ ] 48 Hours
- [ ] 72 Hours
- [ ] Other ____

Container Type:
J = solvent washed, acid rinsed, Teflon sealed glass jar
S = solvent washed, acid rinsed glass bottle
P = natural HDPE plastic bottle
VC = glass vial, Teflon Septum
ZLB = Zip-Lock Bag BB = Bulk Bag

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Report with EI Waste Classification Table [X]

Sampler's Name (EI):	Received by (SGS):
Print: Andrew Schmidt	Print: George Zhi
Signature:	Signature:
Date: 22/3/22	Date: 22/3/22 @ 3pm

Sampler's Comments:
cc: Micaela.Cocen
Please find: COC to Envirolab

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

eiaustralia

Suite 6.01, 55 Miller Street,
PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au

COC June 2021 FORM v5 - SGS

Sheet 4 of 5

Site: 9 Albert St & 3 O'Connell St, North Parramatta

Project No: E25473

Laboratory: SGS Australia, Unit 16, 33 Maddox Street, ALEXANDRIA NSW 2015, P: 02 8594 0400 F: 02 8594 0499

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	SOIL	WATER	0.45 µm field filtered	OTHER	HM A /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM A /TRH/BTEX/PAHs	HM A /TRH/BTEX	BTEX	VOCs / phenolic compounds	Asbestos	Asbestos Quantification	Excavated Natural Material (ENM) Suite	ENM Suite - Stockpile discrete (TRH/BTEX/PAHs)	ENM Suite - Stockpile composite (HM A /pH / EC / Foreign Materials)	Dewatering Suite	pH / pH peroxide	sPOCAS	Chromium Reducible Sulfur (CrS)	PFAS	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	Sulphate / Chloride	Lead	TCLP HM B / PAH
BH17_0.7-0.8	25	S,2LB	22/3/22	am/pm	X					X																		
BH18M_0.1-0.2	26	↓	↓	↓	↓				X																			
_0.5-0.6																												
_1.1-1.2	27									X																		
BH19_0.05-0.1	28								X				X															
_0.2-0.3																												
BH20M_0.1-0.2	29								X																			
_0.5-0.6																												
_1.0-1.1	30									X																		
QD1	31	J	22/3/22	am/pm	X						X																	
QR1	32	S,P,2mL	22/3/22	am/pm		X					X																	
QRB1		↓	↓	↓		X																						

Comments

HM A: Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc

HM B: Arsenic, Cadmium, Chromium, Lead, Mercury, Nickel

Dewatering Suite: pH & EC, TDS / TDU, Hardness, Total Cyanide, Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn), TRH (F1, F2, F3, F4), BTEX, PAH, Total Phenol

LABORATORY TURNAROUND

- [X] Standard
- [ ] 24 Hours
- [ ] 48 Hours
- [ ] 72 Hours
- [ ] Other_____

Container Type:
J = solvent washed, acid rinsed, Tefton sealed glass jar
S = solvent washed, acid rinsed glass bottle
P = natural HDPE plastic bottle
VC = glass vial, Tefton Septum
ZLB = Zip-Lock Bag BB = Bulk Bag

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Report with EI Waste Classification Table [X]

Sampler's Name (EI):	Received by (SGS):
Print: Andrew Schmidt	Print: George Zhi
Signature:	Signature: [signature]
Date: 3/22	Date: 22/3/22 @ 3pm

Sampler's Comments:
cc: Micaela Green
Please fwd: QTI to Envirolab

eiaustralia

Suite 6.01, 55 Miller Street, PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au

COC June 2021 FORM v.5 - SGS

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

Sheet 5 of 5

Site: 9 Albert St & 310 Comett St, North Parramatta

Project No: E25473

Laboratory: SGS Australia
Unit 16, 33 Maddox Street,
ALEXANDRIA NSW 2015
P: 02 8594 0400 F: 02 8594 0499

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	SOIL	WATER	0.45 µm field filtered	OTHER	HM [A] /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM [A] /TRH/BTEX/PAHs	HM [A] /TRH/BTEX	BTEX	VOCs	Asbestos	Asbestos Quantification	Excavated Natural Material (ENM) Suite	ENM Suite - Stockpile discrete (TRH/BTEX/PAHs)	ENM Suite - Stockpile composite (HM [A] /pH / EC / Foreign Materials)	Dewatering Suite	pH / pH peroxide	sPOCAS	Chromium Reducible Sulfur (CrS)	PFAS	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	Sulphate / Chloride	Lead	TCLP HM [B] / PAH
QTB	33	VC	Lab Prepared		X							X															
QTS	34	↓	↓	↓	↓							X															

Comments

HM [A]
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Zinc

HM [B]
Arsenic
Cadmium
Chromium
Lead
Mercury
Nickel

Dewatering Suite
pH & EC
TDS / TDU
Hardness
Total Cyanide
Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
TRH (F1, F2, F3, F4)
BTEX
PAH
Total Phenol

LABORATORY TURNAROUND

- [x] Standard
- [ ] 24 Hours
- [ ] 48 Hours
- [ ] 72 Hours
- [ ] Other ____

Container Type:
J = solvent washed, acid rinsed, Teflon sealed glass jar
S = solvent washed, acid rinsed glass bottle
P = natural HDPE plastic bottle
VC = glass vial, Teflon Septum
ZLB = Zip-Lock Bag BB = Bulk Bag

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Report with EI Waste Classification Table [x]

Sampler's Name (EI)	Received by (SGS)
Print: Andrew Schmidt	Print: George Zhi
Signature:	Signature:
Date: 13/22	Date: 22/3/22 @ 3pm

Sampler's Comments:
cc: Micaela.Green
Please find: QT1 to Enviolab

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

eiaustralia

Suite 6.01, 55 Miller Street,
PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au

COC June 2021 FORM v.5 - SGS

SAMPLE RECEIPT ADVICE

SE230272

CLIENT DETAILS

Contact	Andrew Schmidt
Client	EI AUSTRALIA
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009
Telephone	61 2 95160722
Facsimile	(Not specified)
Email	andrew.schmidt@eiaustralia.com.au
Project	**E25473 9Albert&31O'Connell NthParramatta**
Order Number	**E25473**
Samples	34

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Tue 22/3/2022
Report Due	Wed 30/3/2022
SGS Reference	**SE230272**

SUBMISSION DETAILS

This is to confirm that 34 samples were received on Tuesday 22/3/2022. Results are expected to be ready by COB Wednesday 30/3/2022.
Please quote SGS reference SE230272 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	33 Soil, 1 Water
Date documentation received	23/3/2022@4:42PM	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	8°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

Unless otherwise instructed, water and bulk samples will be held for one month from date of report, and soil samples will be held for two months.

COMMENTS

15 soil and 1 water samples have been placed on hold as no tests have been assigned for them by the client. These samples will not be processed.

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SGS

SAMPLE RECEIPT ADVICE

SE230272

CLIENT DETAILS

Client EI AUSTRALIA Project E25473 9Albert&31O'Connell NthParramatta

SUMMARY OF ANALYSIS

No.	Sample ID	OC Pesticides in Soil	OP Pesticides in Soil	PAH (Polynuclear Aromatic Hydrocarbons) in Soil	PCBs in Soil	Total Phenolics in Soil	TRH (Total Recoverable Hydrocarbons) in Soil	VOC's in Soil	Volatile Petroleum Hydrocarbons in Soil
001	BH1_0.1-0.2	30	14	26	11	-	10	11	7
002	BH1_1.5-1.6	-	-	26	-	-	10	11	7
003	BH2M_0.4-0.5	30	14	26	11	1	10	81	7
004	BH3_0.2-0.3	30	14	26	11	-	10	11	7
005	BH4_0.7-0.8	30	14	26	11	1	10	81	7
006	BH4_1.3-1.4	-	-	26	-	-	10	11	7
007	BH5_0.4-0.5	30	14	26	11	1	10	81	7
008	BH5_0.9-1.0	30	14	26	11	-	10	11	7
009	BH5_1.4-1.5	-	-	26	-	-	10	11	7
010	BH6_0.2-0.3	30	14	26	11	-	10	11	7
011	BH7_0.5-0.6	30	14	26	-	-	10	11	7
012	BH8_0.1-0.2	30	14	26	11	1	10	81	7
013	BH9_0.7-0.8	30	14	26	11	-	10	11	7
014	BH9_1.4-1.5	-	-	26	-	-	10	11	7
015	BH10_0.05-0.1	30	14	26	11	-	10	11	7
016	BH11_0.05-0.1	30	14	26	11	-	10	11	7
017	BH12_0.1-0.2	30	14	26	11	1	10	81	7
018	BH13_0.2-0.3	30	14	26	11	1	10	81	7
019	BH13_0.6-0.7	-	-	26	-	-	10	11	7
020	BH14_0.1-0.2	30	14	26	11	1	10	81	7
021	BH15_0.2-0.3	30	14	26	11	1	10	81	7
022	BH15_0.7-0.8	-	-	26	-	-	10	11	7
023	BH16_0.1-0.2	30	14	26	11	1	10	81	7
024	BH17_0.2-0.3	30	14	26	11	-	10	11	7

CONTINUED OVERLEAF

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

SGS

SAMPLE RECEIPT ADVICE

SE230272

CLIENT DETAILS

Client EI AUSTRALIA Project E25473 9Albert&31O'Connell NthParramatta

SUMMARY OF ANALYSIS

No.	Sample ID	OC Pesticides in Soil	OP Pesticides in Soil	PAH (Polynuclear Aromatic Hydrocarbons) in Soil	PCBs in Soil	Total Phenolics in Soil	TRH (Total Recoverable Hydrocarbons) in Soil	VOC's in Soil	Volatile Petroleum Hydrocarbons in Soil
025	BH17_0.7-0.8	-	-	26	-	-	10	11	7
026	BH18M_0.1-0.2	30	14	26	11	-	10	11	7
027	BH18M_1.1-1.2	-	-	26	-	-	10	11	7
028	BH19_0.05-0.1	30	14	26	11	1	10	81	7
029	BH20M_0.1-0.2	30	14	26	11	-	10	11	7
030	BH20M_1.0-1.1	-	-	26	-	-	10	11	7
031	QD1	-	-	-	-	-	10	11	7
033	QTB	-	-	-	-	-	-	11	-
034	QTS	-	-	-	-	-	-	11	-

CONTINUED OVERLEAF

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
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SGS

SAMPLE RECEIPT ADVICE

SE230272

CLIENT DETAILS

Client EI AUSTRALIA Project E25473 9Albert&31O'Connell NthParramatta

SUMMARY OF ANALYSIS

No.	Sample ID	Fibre Identification in soil	Mercury in Soil	Moisture Content	Total Recoverable Elements in Soil/Waste
001	BH1_0.1-0.2	2	1	1	7
002	BH1_1.5-1.6	-	1	1	7
003	BH2M_0.4-0.5	2	1	1	7
004	BH3_0.2-0.3	2	1	1	7
005	BH4_0.7-0.8	2	1	1	7
006	BH4_1.3-1.4	-	1	1	7
007	BH5_0.4-0.5	2	1	1	7
008	BH5_0.9-1.0	2	1	1	7
009	BH5_1.4-1.5	-	1	1	7
010	BH6_0.2-0.3	2	1	1	7
011	BH7_0.5-0.6	2	1	1	7
012	BH8_0.1-0.2	2	1	1	7
013	BH9_0.7-0.8	2	1	1	7
014	BH9_1.4-1.5	-	1	1	7
015	BH10_0.05-0.1	2	1	1	7
016	BH11_0.05-0.1	2	1	1	7
017	BH12_0.1-0.2	2	1	1	7
018	BH13_0.2-0.3	2	1	1	7
019	BH13_0.6-0.7	-	1	1	7
020	BH14_0.1-0.2	2	1	1	7
021	BH15_0.2-0.3	2	1	1	7
022	BH15_0.7-0.8	-	1	1	7
023	BH16_0.1-0.2	2	1	1	7
024	BH17_0.2-0.3	2	1	1	7

CONTINUED OVERLEAF

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
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SAMPLE RECEIPT ADVICE

SE230272

CLIENT DETAILS

Client EI AUSTRALIA Project E25473 9Albert&31O'Connell NthParramatta

SUMMARY OF ANALYSIS

No.	Sample ID	Fibre Identification in soil	Mercury in Soil	Moisture Content	Total Recoverable Elements in Soil/Waste
025	BH17_0.7-0.8	-	1	1	7
026	BH18M_0.1-0.2	2	1	1	7
027	BH18M_1.1-1.2	-	1	1	7
028	BH19_0.05-0.1	2	1	1	7
029	BH20M_0.1-0.2	2	1	1	7
030	BH20M_1.0-1.1	-	1	1	7
031	QD1	-	1	1	7
033	QTB	-	-	1	-

CONTINUED OVERLEAF

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

SGS

SAMPLE RECEIPT ADVICE

SE230272

CLIENT DETAILS

Client EI AUSTRALIA Project E25473 9Albert&31O'Connell NthParramatta

SUMMARY OF ANALYSIS

No.	Sample ID	Mercury (dissolved) in Water	Trace Metals (Dissolved) in Water by ICPMS	TRH (Total Recoverable Hydrocarbons) in Water	VOCs in Water	Volatile Petroleum Hydrocarbons in Water
032	QR1	1	7	9	11	7

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

Yin, Emily (Sydney)

From: Micaela Green - ElAustralia <micaela.green@eiaustralia.com.au>
Sent: Wednesday, 30 March 2022 4:11 PM
To: AU.SampleReceipt.Sydney (Sydney)
Cc: AU.Environmental.Sydney (Sydney)
Subject: [EXTERNAL] RE: Report Job SE230272, your reference E25473 9Albert&31O'Connell NthParramatta, order number E25473

*** WARNING: this message is from an EXTERNAL SENDER. Please be cautious, particularly with links and attachments. ***

Hi SGS,

Could I please request the following Analysis

SGS EHS Alexandria Laboratory
SE230272A COC
Received: 30 – Mar – 2022

3
- BH2M_0.4-0.5
  - Lead TCLP
  - B(a)P TCLP

5
- BH4_0.7-0.8
  - Lead TCLP
  - B(a)P TCLP

10
- BH6_0.2-0.3
  - B(a)P TCLP

12
- BH8_0.1-0.2
  - Lead TCLP

13
- BH9_0.7-0.8
  - Lead TCLP
  - B(a)P TCLP

14
- BH10_0.05-0.1
  - Chromium TCLP
  - Nickel TCLP

On standard TAT

Kind Regards,

Micaela Green
Environmental Scientist
T 95160722 M 0435297482
E micaela.green@eiaustralia.com.au
Suite 6.01, 55 Miller Street
Pyrmont, NSW 2009
www.eiaustralia.com.au

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1

SAMPLE RECEIPT ADVICE

SE230272A

CLIENT DETAILS

Contact	Andrew Schmidt
Client	EI AUSTRALIA
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009
Telephone	61 2 95160722
Facsimile	(Not specified)
Email	andrew.schmidt@eiaustralia.com.au
Project	**E25473 9Albert&31O'Connell NthParramatta**
Order Number	**E25473**
Samples	34

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Wed 30/3/2022
Report Due	Wed 6/4/2022
SGS Reference	**SE230272A**

SUBMISSION DETAILS

This is to confirm that 34 samples were received on Wednesday 30/3/2022. Results are expected to be ready by COB Wednesday 6/4/2022.
Please quote SGS reference SE230272A when making enquiries. Refer below for details relating to sample integrity upon receipt.

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	6 Soil
Date documentation received	30/3/2022@4:11pm	Type of documentation received	Email
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	8°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

Unless otherwise instructed, water and bulk samples will be held for one month from date of report, and soil samples will be held for two months.

COMMENTS

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SAMPLE RECEIPT ADVICE

SE230272A

CLIENT DETAILS

Client EI AUSTRALIA Project E25473 9Albert&31O'Connell NthParramatta

SUMMARY OF ANALYSIS

No.	Sample ID	Metals in TCLP Extract by ICPOES	PAH (Polynuclear Aromatic Hydrocarbons) in TCLP	TCLP (Toxicity Characteristic Leaching	TCLP (Toxicity Characteristic Leaching
003	BH2M_0.4-0.5	1	4	-	6
005	BH4_0.7-0.8	1	4	-	6
010	BH6_0.2-0.3	-	4	-	6
012	BH8_0.1-0.2	1	-	6	-
013	BH9_0.7-0.8	1	4	-	6
015	BH10_0.05-0.1	2	-	6	-

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

Sheet 1 of 1

Site: 9 Albert St, 31 O'Connell St, North Parramatta

Project No: E25473

Laboratory: SGS Australia
Unit 16, 33 Maddox Street,
ALEXANDRIA NSW 2015
P: 02 8594 0400 F: 02 8594 0499

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	SOIL	WATER	0.45 µm field filtered	OTHER	HM[A] /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM[A] /TRH/BTEX/PAHs	HM[A] /TRH/BTEX	pH	VOCs /phenols	Asbestos	Asbestos Quantification	Excavated Natural Material (ENM) Suite	Dewatering Suite	pH / pH peroxide	sPOCAS	Chromium Reducible Sulfur (CrS)	PFAS	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	Sulphate / Chloride		TCLP HM[B] / PAH	Comments
GW-BH2M-1	1	BS250	28/3/22	am		X	X			X		X	X													HM[A] Arsenic Cadmium Chromium Copper Lead Mercury Nickel Zinc
GW-BH18M-1	2									X		X	X													HM[A] Arsenic Cadmium Chromium Lead Mercury Nickel
GW-BH20M-1	3										X	X	X													Dewatering Suite pH & EC TDS / TDU Hardness Total Cyanide Metals (Al, As, Cd, Cr, Co, Pb, Hg, Ni, Zn) TRH (F1, F2, F3, F4) BTEX PAH
QD1	4												X													
QD1	5												X													
QA1&2													X													
QTB1	6	VC	Lab prepared											X										X		
QTB2	7	VC												X												

SGS EHS Sydney COC
SE230450

Container Type:
J = solvent washed, acid rinsed, Teflon sealed glass jar
S = solvent washed, acid rinsed glass bottle
P = natural HDPE plastic bottle
VC = glass vial, Teflon Septum
ZLB = Zip-Lock Bag

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Sampler's Name (EI): Print Manish Chandra Signature

Date 29/3/22

Received by (SGS): Print George Zhi Signature

Date 29/3/22 @ 1:55 pm

LABORATORY TURNAROUND
☒ Standard
☐ 24 Hours
☐ 48 Hours
☐ 72 Hours
☐ Other____

Report with EI Waste Classification Table ☐

Sampler's Comments:
Please forward QTB to Envirolab

eiaustralia
Contamination | Remediation | Validation
Suite 6.01, 55 Miller Street,
PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au
COC June 2021 FORM V5 - SGS

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

Yin, Emily (Sydney)

From: Micaela Green - EIAustralia <micaela.green@eiaustralia.com.au>
Sent: Wednesday, 30 March 2022 1:53 PM
To: Yin, Emily (Sydney)
Cc: Manish Chandra - EIAustralia; AU.Environmental.Sydney (Sydney)
Subject: [EXTERNAL] RE: SE230450 - E25473

*** WARNING: this message is from an EXTERNAL SENDER. Please be cautious, particularly with links and attachments. ***

Hi Emily,

Yes sorry, QTB1 and QTS1 should be for BTEX

pH still on the 3 primary samples.

Apologies for the inconvenience

Kind Regards,

Micaela Green
Environmental Scientist
T 95160722 M 0435297482
E micaela.green@eiaustralia.com.au
Suite 6.01, 55 Miller Street
Pyrmont, NSW 2009
www.eiaustralia.com.au

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From: Manish Chandra - EIAustralia
Sent: Wednesday, 30 March 2022 7:27 AM
To: Micaela Green - EIAustralia
Subject: Fwd: SE230450 - E25473

Sent from my iPhone

Begin forwarded message:

From: "Yin, Emily (Sydney)" <Emily.Yin@sgs.com>
Date: 29 March 2022 at 5:39:22 pm AEDT
To: Manish Chandra - EIAustralia <manish.chandra@eiaustralia.com.au>
Subject: SE230450 - E25473

Dear Manish,

I think QTB1 and QTS1 Should be for BTEX.
Not pH.
Please advise as soon as possible.
Thank You,

Regards,

Emily Yin
Environment, Health & Safety
Sample Receipt

SGS Australia Pty Ltd
Unit 16, 33 Maddox Street
Alexandria NSW 2015

Phone: +61 (0)2 8594 0400
Fax: +61 (0)2 8594 0499
E-mail: au.samplereceipt.sydney@sgs.com

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SAMPLE RECEIPT ADVICE

SE230450

CLIENT DETAILS

Contact	Manish Chandra
Client	EI AUSTRALIA
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009
Telephone	61 2 95160722
Facsimile	(Not specified)
Email	manish.chandra@eiaustralia.com.au
Project	**E25473 9 Albert St & 31 O' Connel St, N**
Order Number	**E25473**
Samples	7

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Tue 29/3/2022
Report Due	Tue 5/4/2022
SGS Reference	**SE230450**

SUBMISSION DETAILS

This is to confirm that 7 samples were received on Tuesday 29/3/2022. Results are expected to be ready by COB Tuesday 5/4/2022. Please quote SGS reference SE230450 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	7 Water
Date documentation received	29/3/2022	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	16°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

Unless otherwise instructed, water and bulk samples will be held for one month from date of report, and soil samples will be held for two months.

COMMENTS

1 sample has been placed on hold as no tests have been assigned for it. This sample will not be processed.

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SGS

SAMPLE RECEIPT ADVICE

SE230450

CLIENT DETAILS

Client EI AUSTRALIA Project E25473 9 Albert St & 31 O' Connel St, N

SUMMARY OF ANALYSIS

No.	Sample ID	Mercury (dissolved) in Water	PAH (Polynuclear Aromatic Hydrocarbons) in Water	pH in water	Total Phenolics in Water	Trace Metals (Dissolved) in Water by ICPMS	TRH (Total Recoverable Hydrocarbons) in Water	VOCs in Water	Volatile Petroleum Hydrocarbons in Water
001	GW-BH2M-1	1	22	1	1	7	9	78	7
002	GW-BH18M-1	1	22	1	1	7	9	78	7
003	GW-BH20M-1	1	22	1	1	7	9	78	7
004	QD1	1	-	-	-	7	9	11	7
005	QR1	1	-	-	-	7	9	11	7
006	QTB1	-	-	-	-	-	-	11	-
007	QTS1	-	-	-	-	-	-	11	-

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Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

30/03/2022

Page 2 of 2

Appendix K – Laboratory Analytical Reports

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 291835

Client Details	
Client	EI Australia
Attention	Micaela Green
Address	Suite 6.01, 55 Miller Street, Pyrmont, NSW, 2009

Sample Details	
Your Reference	**E25473, 9 Albert St & 31 O'Connell St North Parram**
Number of Samples	1 Soil
Date samples received	25/03/2022
Date completed instructions received	25/03/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details	
Date results requested by	01/04/2022
Date of Issue	01/04/2022

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Results Approved By
Giovanni Agosti, Group Technical Manager
Josh Williams, Organics and LC Supervisor
Liam Timmins, Chemist
Thomas Beenie, Lab Technician

Authorised By

Nancy Zhang, Laboratory Manager

Client Reference: E25473, 9 Albert St & 31 O'Connell St North Parram

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		291835-1
Your Reference	UNITS	QT1
Date Sampled		22/03/2022
Type of sample		Soil
Date extracted	-	28/03/2022
Date analysed	-	28/03/2022
TRH C_6 - C_9	mg/kg	<25
TRH C_6 - C_{10}	mg/kg	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
Naphthalene	mg/kg	<1
Total +ve Xylenes	mg/kg	<1
Surrogate aaa-Trifluorotoluene	%	107

Client Reference: E25473, 9 Albert St & 31 O'Connell St North Parram

svTRH (C10-C40) in Soil		
Our Reference		291835-1
Your Reference	UNITS	QT1
Date Sampled		22/03/2022
Type of sample		Soil
Date extracted	-	28/03/2022
Date analysed	-	29/03/2022
TRH C_{10} - C_{14}	mg/kg	<50
TRH C_{15} - C_{28}	mg/kg	<100
TRH C_{29} - C_{36}	mg/kg	<100
Total +ve TRH (C10-C36)	mg/kg	<50
TRH >C_{10} -C_{16}	mg/kg	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50
TRH >C_{16} -C_{34}	mg/kg	<100
TRH >C_{34} -C_{40}	mg/kg	<100
Total +ve TRH (>C10-C40)	mg/kg	<50
Surrogate o-Terphenyl	%	73

Client Reference: E25473, 9 Albert St & 31 O'Connell St North Parram

Acid Extractable metals in soil		
Our Reference		291835-1
Your Reference	UNITS	QT1
Date Sampled		22/03/2022
Type of sample		Soil
Date prepared	-	28/03/2022
Date analysed	-	30/03/2022
Arsenic	mg/kg	7
Cadmium	mg/kg	<0.4
Chromium	mg/kg	36
Copper	mg/kg	33
Lead	mg/kg	65
Mercury	mg/kg	0.2
Nickel	mg/kg	2
Zinc	mg/kg	49

Client Reference: E25473, 9 Albert St & 31 O'Connell St North Parram

Moisture		
Our Reference		291835-1
Your Reference	UNITS	QT1
Date Sampled		22/03/2022
Type of sample		Soil
Date prepared	-	28/03/2022
Date analysed	-	29/03/2022
Moisture	%	9.6

Client Reference: E25473, 9 Albert St & 31 O'Connell St North Parram

Method ID	Methodology Summary
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

Client Reference: E25473, 9 Albert St & 31 O'Connell St North Parram

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date extracted	-			28/03/2022	[NT]	[NT]	[NT]	[NT]	28/03/2022	[NT]
Date analysed	-			28/03/2022	[NT]	[NT]	[NT]	[NT]	28/03/2022	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	82	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	82	[NT]
Benzene	mg/kg	0.2	Org-023	<0.2	[NT]	[NT]	[NT]	[NT]	84	[NT]
Toluene	mg/kg	0.5	Org-023	<0.5	[NT]	[NT]	[NT]	[NT]	82	[NT]
Ethylbenzene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	81	[NT]
m+p-xylene	mg/kg	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	82	[NT]
o-Xylene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	82	[NT]
Naphthalene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	102	[NT]	[NT]	[NT]	[NT]	92	[NT]

Client Reference: E25473, 9 Albert St & 31 O'Connell St North Parram

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date extracted	-			28/03/2022	[NT]	[NT]	[NT]	[NT]	28/03/2022	[NT]
Date analysed	-			29/03/2022	[NT]	[NT]	[NT]	[NT]	29/03/2022	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	83	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	77	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	121	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	83	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	77	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	121	[NT]
Surrogate o-Terphenyl	%		Org-020	80	[NT]	[NT]	[NT]	[NT]	78	[NT]

Client Reference: E25473, 9 Albert St & 31 O'Connell St North Parram

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date prepared	-			28/03/2022	[NT]	[NT]	[NT]	[NT]	28/03/2022	[NT]
Date analysed	-			30/03/2022	[NT]	[NT]	[NT]	[NT]	30/03/2022	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	100	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	100	[NT]
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	114	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	107	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]

Client Reference: E25473, 9 Albert St & 31 O'Connell St North Parram

Result Definitions	
NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Client Reference: E25473, 9 Albert St & 31 O'Connell St North Parram

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

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When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Envirolab Services Pty Ltd
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CERTIFICATE OF ANALYSIS 292216

Client Details	
Client	EI Australia
Attention	Lab Email
Address	Suite 6.01, 55 Miller Street, Pyrmont, NSW, 2009

Sample Details	
Your Reference	**E25473, 9 Albert St & 31 O'Connell St North Parram**
Number of Samples	1 Water
Date samples received	30/03/2022
Date completed instructions received	30/03/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details	
Date results requested by	06/04/2022
Date of Issue	05/04/2022

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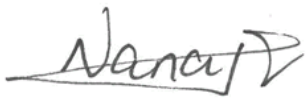
Results Approved By
Dragana Tomas, Senior Chemist
Giovanni Agosti, Group Technical Manager
Steven Luong, Senior Chemist

Authorised By



Nancy Zhang, Laboratory Manager

Client Reference: E25473, 9 Albert St & 31 O'Connell St North Parram

vTRH(C6-C10)/BTEXN in Water		
Our Reference		292216-1
Your Reference	UNITS	QT1
Date Sampled		29/03/2022
Type of sample		Water
Date extracted	-	31/03/2022
Date analysed	-	31/03/2022
TRH C_6 - C_9	µg/L	<10
TRH C_6 - C_{10}	µg/L	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10
Benzene	µg/L	<1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Naphthalene	µg/L	<1
Surrogate Dibromofluoromethane	%	90
Surrogate toluene-d8	%	100
Surrogate 4-BFB	%	100

Client Reference: E25473, 9 Albert St & 31 O'Connell St North Parram

svTRH (C10-C40) in Water		
Our Reference		292216-1
Your Reference	UNITS	QT1
Date Sampled		29/03/2022
Type of sample		Water
Date extracted	-	04/04/2022
Date analysed	-	05/04/2022
TRH C_{10} - C_{14}	µg/L	<50
TRH C_{15} - C_{28}	µg/L	<100
TRH C_{29} - C_{36}	µg/L	<100
Total +ve TRH (C10-C36)	µg/L	<50
TRH >C_{10} - C_{16}	µg/L	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50
TRH >C_{16} - C_{34}	µg/L	<100
TRH >C_{34} - C_{40}	µg/L	<100
Total +ve TRH (>C10-C40)	µg/L	<50
Surrogate o-Terphenyl	%	101

Client Reference: E25473, 9 Albert St & 31 O'Connell St North Parram

HM in water - dissolved		
Our Reference		292216-1
Your Reference	UNITS	QT1
Date Sampled		29/03/2022
Type of sample		Water
Date prepared	-	31/03/2022
Date analysed	-	31/03/2022
Arsenic-Dissolved	µg/L	<1
Cadmium-Dissolved	µg/L	<0.1
Chromium-Dissolved	µg/L	<1
Copper-Dissolved	µg/L	<1
Lead-Dissolved	µg/L	<1
Mercury-Dissolved	µg/L	<0.05
Nickel-Dissolved	µg/L	1
Zinc-Dissolved	µg/L	46

Client Reference: E25473, 9 Albert St & 31 O'Connell St North Parram

Method ID	Methodology Summary
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-023	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

Client Reference: E25473, 9 Albert St & 31 O'Connell St North Parram

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			31/03/2022	[NT]	[NT]	[NT]	[NT]	31/03/2022	[NT]
Date analysed	-			31/03/2022	[NT]	[NT]	[NT]	[NT]	31/03/2022	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	110	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	110	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	116	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	108	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	109	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	116	[NT]
Naphthalene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	92	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate toluene-d8	%		Org-023	109	[NT]	[NT]	[NT]	[NT]	107	[NT]
Surrogate 4-BFB	%		Org-023	102	[NT]	[NT]	[NT]	[NT]	110	[NT]

Client Reference: E25473, 9 Albert St & 31 O'Connell St North Parram

QUALITY CONTROL: svTRH (C10-C40) in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date extracted	-			04/04/2022	[NT]	[NT]	[NT]	[NT]	04/04/2022	[NT]
Date analysed	-			05/04/2022	[NT]	[NT]	[NT]	[NT]	05/04/2022	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	93	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	87	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	94	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	93	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	87	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	94	[NT]
Surrogate o-Terphenyl	%		Org-020	91	[NT]	[NT]	[NT]	[NT]	110	[NT]

Client Reference: E25473, 9 Albert St & 31 O'Connell St North Parram

QUALITY CONTROL: HM in water - dissolved					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date prepared	-			31/03/2022	[NT]	[NT]	[NT]	[NT]	31/03/2022	[NT]
Date analysed	-			31/03/2022	[NT]	[NT]	[NT]	[NT]	31/03/2022	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	[NT]	[NT]	[NT]	[NT]	110	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	95	[NT]

Client Reference: E25473, 9 Albert St & 31 O'Connell St North Parram

Result Definitions	
NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Client Reference: E25473, 9 Albert St & 31 O'Connell St North Parram

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
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Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

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Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

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Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

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ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Andrew Schmidt
Client	EI AUSTRALIA
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Telephone	61 2 95160722
Facsimile	(Not specified)
Email	andrew.schmidt@eiaustralia.com.au
Project	**E25473 9Albert&31O'Connell NthParramatta**
Order Number	**E25473**
Samples	34

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
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SGS Reference	**SE230272 R0**
Date Received	22/3/2022
Date Reported	30/3/2022

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

No respirable fibres detected in all soil samples using trace analysis technique.

Asbestos analysed by Approved Identifier Yusuf Kuthpudin.

SIGNATORIES

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ANALYTICAL RESULTS

SE230272 R0

VOC's in Soil [AN433] Tested: 24/3/2022

PARAMETER	UOM	LOR	BH1_0.1-0.2 SOIL - 22/3/2022 SE230272.001	BH1_1.5-1.6 SOIL - 22/3/2022 SE230272.002	BH2M_0.4-0.5 SOIL - 22/3/2022 SE230272.003	BH3_0.2-0.3 SOIL - 22/3/2022 SE230272.004	BH4_0.7-0.8 SOIL - 22/3/2022 SE230272.005
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene (VOC)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorodifluoromethane (CFC-12)	mg/kg	1	-	-	<1	-	<1
Chloromethane	mg/kg	1	-	-	<1	-	<1
Vinyl chloride (Chloroethene)	mg/kg	0.1	-	-	<0.1	-	<0.1
Bromomethane	mg/kg	1	-	-	<1	-	<1
Chloroethane	mg/kg	1	-	-	<1	-	<1
Trichlorofluoromethane	mg/kg	1	-	-	<1	-	<1
Acetone (2-propanone)	mg/kg	10	-	-	<10	-	<10
Iodomethane	mg/kg	5	-	-	<5	-	<5
1,1-dichloroethene	mg/kg	0.1	-	-	<0.1	-	<0.1
Acrylonitrile	mg/kg	0.1	-	-	<0.1	-	<0.1
Dichloromethane (Methylene chloride)	mg/kg	0.5	-	-	<0.5	-	<0.5
Allyl chloride	mg/kg	0.1	-	-	<0.1	-	<0.1
Carbon disulfide	mg/kg	0.5	-	-	<0.5	-	<0.5
trans-1,2-dichloroethene	mg/kg	0.1	-	-	<0.1	-	<0.1
MtBE (Methyl-tert-butyl ether)	mg/kg	0.1	-	-	<0.1	-	<0.1
1,1-dichloroethane	mg/kg	0.1	-	-	<0.1	-	<0.1
Vinyl acetate	mg/kg	10	-	-	<10	-	<10
MEK (2-butanone)	mg/kg	10	-	-	<10	-	<10
cis-1,2-dichloroethene	mg/kg	0.1	-	-	<0.1	-	<0.1
Bromochloromethane	mg/kg	0.1	-	-	<0.1	-	<0.1
Chloroform	mg/kg	0.1	-	-	<0.1	-	<0.1
2,2-dichloropropane	mg/kg	0.1	-	-	<0.1	-	<0.1
1,2-dichloroethane	mg/kg	0.1	-	-	<0.1	-	<0.1
1,1,1-trichloroethane	mg/kg	0.1	-	-	<0.1	-	<0.1
1,1-dichloropropene	mg/kg	0.1	-	-	<0.1	-	<0.1
Carbon tetrachloride	mg/kg	0.1	-	-	<0.1	-	<0.1
Dibromomethane	mg/kg	0.1	-	-	<0.1	-	<0.1
1,2-dichloropropane	mg/kg	0.1	-	-	<0.1	-	<0.1
Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	-	-	<0.1	-	<0.1
2-nitropropane	mg/kg	10	-	-	<10	-	<10
Bromodichloromethane	mg/kg	0.1	-	-	<0.1	-	<0.1
MIBK (4-methyl-2-pentanone)	mg/kg	1	-	-	<1	-	<1
cis-1,3-dichloropropene	mg/kg	0.1	-	-	<0.1	-	<0.1
trans-1,3-dichloropropene	mg/kg	0.1	-	-	<0.1	-	<0.1
1,1,2-trichloroethane	mg/kg	0.1	-	-	<0.1	-	<0.1
1,3-dichloropropane	mg/kg	0.1	-	-	<0.1	-	<0.1
Chlorodibromomethane	mg/kg	0.1	-	-	<0.1	-	<0.1
2-hexanone (MBK)	mg/kg	5	-	-	<5	-	<5
1,2-dibromoethane (EDB)	mg/kg	0.1	-	-	<0.1	-	<0.1
Tetrachloroethene (Perchloroethylene,PCE)	mg/kg	0.1	-	-	<0.1	-	<0.1
1,1,1,2-tetrachloroethane	mg/kg	0.1	-	-	<0.1	-	<0.1
Chlorobenzene	mg/kg	0.1	-	-	<0.1	-	<0.1
Bromoform	mg/kg	0.1	-	-	<0.1	-	<0.1
cis-1,4-dichloro-2-butene	mg/kg	1	-	-	<1	-	<1
Styrene (Vinyl benzene)	mg/kg	0.1	-	-	<0.1	-	<0.1
1,1,2,2-tetrachloroethane	mg/kg	0.1	-	-	<0.1	-	<0.1
1,2,3-trichloropropane	mg/kg	0.1	-	-	<0.1	-	<0.1
trans-1,4-dichloro-2-butene	mg/kg	1	-	-	<1	-	<1

ANALYTICAL RESULTS SE230272 R0

VOC's in Soil [AN433] Tested: 24/3/2022 (continued)

PARAMETER	UOM	LOR	BH1_0.1-0.2 SOIL - 22/3/2022 SE230272.001	BH1_1.5-1.6 SOIL - 22/3/2022 SE230272.002	BH2M_0.4-0.5 SOIL - 22/3/2022 SE230272.003	BH3_0.2-0.3 SOIL - 22/3/2022 SE230272.004	BH4_0.7-0.8 SOIL - 22/3/2022 SE230272.005
Isopropylbenzene (Cumene)	mg/kg	0.1	-	-	<0.1	-	<0.1
Bromobenzene	mg/kg	0.1	-	-	<0.1	-	<0.1
n-propylbenzene	mg/kg	0.1	-	-	<0.1	-	<0.1
2-chlorotoluene	mg/kg	0.1	-	-	<0.1	-	<0.1
4-chlorotoluene	mg/kg	0.1	-	-	<0.1	-	<0.1
1,3,5-trimethylbenzene	mg/kg	0.1	-	-	<0.1	-	<0.1
tert-butylbenzene	mg/kg	0.1	-	-	<0.1	-	<0.1
1,2,4-trimethylbenzene	mg/kg	0.1	-	-	<0.1	-	<0.1
sec-butylbenzene	mg/kg	0.1	-	-	<0.1	-	<0.1
1,3-dichlorobenzene	mg/kg	0.1	-	-	<0.1	-	<0.1
1,4-dichlorobenzene	mg/kg	0.1	-	-	<0.1	-	<0.1
p-isopropyltoluene	mg/kg	0.1	-	-	<0.1	-	<0.1
1,2-dichlorobenzene	mg/kg	0.1	-	-	<0.1	-	<0.1
n-butylbenzene	mg/kg	0.1	-	-	<0.1	-	<0.1
1,2-dibromo-3-chloropropane	mg/kg	0.1	-	-	<0.1	-	<0.1
1,2,4-trichlorobenzene	mg/kg	0.1	-	-	<0.1	-	<0.1
Hexachlorobutadiene	mg/kg	0.1	-	-	<0.1	-	<0.1
1,2,3-trichlorobenzene	mg/kg	0.1	-	-	<0.1	-	<0.1
Total VOC*	mg/kg	24	-	-	<24	-	<24
Total Volatile Chlorinated Hydrocarbons*	mg/kg	3	-	-	<3.0	-	<3.0
Total Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	-	-	<1.8	-	<1.8
Total Other Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	-	-	<1.8	-	<1.8

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ANALYTICAL RESULTS SE230272 R0

VOC's in Soil [AN433] Tested: 24/3/2022 (continued)

PARAMETER	UOM	LOR	BH4_1.3-1.4 SOIL - 22/3/2022 SE230272.006	BH5_0.4-0.5 SOIL - 22/3/2022 SE230272.007	BH5_0.9-1.0 SOIL - 22/3/2022 SE230272.008	BH5_1.4-1.5 SOIL - 22/3/2022 SE230272.009	BH6_0.2-0.3 SOIL - 22/3/2022 SE230272.010
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene (VOC)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorodifluoromethane (CFC-12)	mg/kg	1	-	<1	-	-	-
Chloromethane	mg/kg	1	-	<1	-	-	-
Vinyl chloride (Chloroethene)	mg/kg	0.1	-	<0.1	-	-	-
Bromomethane	mg/kg	1	-	<1	-	-	-
Chloroethane	mg/kg	1	-	<1	-	-	-
Trichlorofluoromethane	mg/kg	1	-	<1	-	-	-
Acetone (2-propanone)	mg/kg	10	-	<10	-	-	-
Iodomethane	mg/kg	5	-	<5	-	-	-
1,1-dichloroethene	mg/kg	0.1	-	<0.1	-	-	-
Acrylonitrile	mg/kg	0.1	-	<0.1	-	-	-
Dichloromethane (Methylene chloride)	mg/kg	0.5	-	<0.5	-	-	-
Allyl chloride	mg/kg	0.1	-	<0.1	-	-	-
Carbon disulfide	mg/kg	0.5	-	<0.5	-	-	-
trans-1,2-dichloroethene	mg/kg	0.1	-	<0.1	-	-	-
MtBE (Methyl-tert-butyl ether)	mg/kg	0.1	-	<0.1	-	-	-
1,1-dichloroethane	mg/kg	0.1	-	<0.1	-	-	-
Vinyl acetate	mg/kg	10	-	<10	-	-	-
MEK (2-butanone)	mg/kg	10	-	<10	-	-	-
cis-1,2-dichloroethene	mg/kg	0.1	-	<0.1	-	-	-
Bromochloromethane	mg/kg	0.1	-	<0.1	-	-	-
Chloroform	mg/kg	0.1	-	<0.1	-	-	-
2,2-dichloropropane	mg/kg	0.1	-	<0.1	-	-	-
1,2-dichloroethane	mg/kg	0.1	-	<0.1	-	-	-
1,1,1-trichloroethane	mg/kg	0.1	-	<0.1	-	-	-
1,1-dichloropropene	mg/kg	0.1	-	<0.1	-	-	-
Carbon tetrachloride	mg/kg	0.1	-	<0.1	-	-	-
Dibromomethane	mg/kg	0.1	-	<0.1	-	-	-
1,2-dichloropropane	mg/kg	0.1	-	<0.1	-	-	-
Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	-	<0.1	-	-	-
2-nitropropane	mg/kg	10	-	<10	-	-	-
Bromodichloromethane	mg/kg	0.1	-	<0.1	-	-	-
MIBK (4-methyl-2-pentanone)	mg/kg	1	-	<1	-	-	-
cis-1,3-dichloropropene	mg/kg	0.1	-	<0.1	-	-	-
trans-1,3-dichloropropene	mg/kg	0.1	-	<0.1	-	-	-
1,1,2-trichloroethane	mg/kg	0.1	-	<0.1	-	-	-
1,3-dichloropropane	mg/kg	0.1	-	<0.1	-	-	-
Chlorodibromomethane	mg/kg	0.1	-	<0.1	-	-	-
2-hexanone (MBK)	mg/kg	5	-	<5	-	-	-
1,2-dibromoethane (EDB)	mg/kg	0.1	-	<0.1	-	-	-
Tetrachloroethene (Perchloroethylene,PCE)	mg/kg	0.1	-	<0.1	-	-	-
1,1,1,2-tetrachloroethane	mg/kg	0.1	-	<0.1	-	-	-
Chlorobenzene	mg/kg	0.1	-	<0.1	-	-	-
Bromoform	mg/kg	0.1	-	<0.1	-	-	-
cis-1,4-dichloro-2-butene	mg/kg	1	-	<1	-	-	-
Styrene (Vinyl benzene)	mg/kg	0.1	-	<0.1	-	-	-
1,1,2,2-tetrachloroethane	mg/kg	0.1	-	<0.1	-	-	-
1,2,3-trichloropropane	mg/kg	0.1	-	<0.1	-	-	-
trans-1,4-dichloro-2-butene	mg/kg	1	-	<1	-	-	-

ANALYTICAL RESULTS SE230272 R0

VOC's in Soil [AN433] Tested: 24/3/2022 (continued)

PARAMETER	UOM	LOR	BH4_1.3-1.4 SOIL - 22/3/2022 SE230272.006	BH5_0.4-0.5 SOIL - 22/3/2022 SE230272.007	BH5_0.9-1.0 SOIL - 22/3/2022 SE230272.008	BH5_1.4-1.5 SOIL - 22/3/2022 SE230272.009	BH6_0.2-0.3 SOIL - 22/3/2022 SE230272.010
Isopropylbenzene (Cumene)	mg/kg	0.1	-	<0.1	-	-	-
Bromobenzene	mg/kg	0.1	-	<0.1	-	-	-
n-propylbenzene	mg/kg	0.1	-	<0.1	-	-	-
2-chlorotoluene	mg/kg	0.1	-	<0.1	-	-	-
4-chlorotoluene	mg/kg	0.1	-	<0.1	-	-	-
1,3,5-trimethylbenzene	mg/kg	0.1	-	<0.1	-	-	-
tert-butylbenzene	mg/kg	0.1	-	<0.1	-	-	-
1,2,4-trimethylbenzene	mg/kg	0.1	-	<0.1	-	-	-
sec-butylbenzene	mg/kg	0.1	-	<0.1	-	-	-
1,3-dichlorobenzene	mg/kg	0.1	-	<0.1	-	-	-
1,4-dichlorobenzene	mg/kg	0.1	-	<0.1	-	-	-
p-isopropyltoluene	mg/kg	0.1	-	<0.1	-	-	-
1,2-dichlorobenzene	mg/kg	0.1	-	<0.1	-	-	-
n-butylbenzene	mg/kg	0.1	-	<0.1	-	-	-
1,2-dibromo-3-chloropropane	mg/kg	0.1	-	<0.1	-	-	-
1,2,4-trichlorobenzene	mg/kg	0.1	-	<0.1	-	-	-
Hexachlorobutadiene	mg/kg	0.1	-	<0.1	-	-	-
1,2,3-trichlorobenzene	mg/kg	0.1	-	<0.1	-	-	-
Total VOC*	mg/kg	24	-	<24	-	-	-
Total Volatile Chlorinated Hydrocarbons*	mg/kg	3	-	<3.0	-	-	-
Total Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	-	<1.8	-	-	-
Total Other Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	-	<1.8	-	-	-

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ANALYTICAL RESULTS SE230272 R0

VOC's in Soil [AN433] Tested: 24/3/2022 (continued)

PARAMETER	UOM	LOR	BH7_0.5-0.6 SOIL - 22/3/2022 SE230272.011	BH8_0.1-0.2 SOIL - 22/3/2022 SE230272.012	BH9_0.7-0.8 SOIL - 22/3/2022 SE230272.013	BH9_1.4-1.5 SOIL - 22/3/2022 SE230272.014	BH10_0.05-0.1 SOIL - 22/3/2022 SE230272.015
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene (VOC)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorodifluoromethane (CFC-12)	mg/kg	1	-	<1	-	-	-
Chloromethane	mg/kg	1	-	<1	-	-	-
Vinyl chloride (Chloroethene)	mg/kg	0.1	-	<0.1	-	-	-
Bromomethane	mg/kg	1	-	<1	-	-	-
Chloroethane	mg/kg	1	-	<1	-	-	-
Trichlorofluoromethane	mg/kg	1	-	<1	-	-	-
Acetone (2-propanone)	mg/kg	10	-	<10	-	-	-
Iodomethane	mg/kg	5	-	<5	-	-	-
1,1-dichloroethene	mg/kg	0.1	-	<0.1	-	-	-
Acrylonitrile	mg/kg	0.1	-	<0.1	-	-	-
Dichloromethane (Methylene chloride)	mg/kg	0.5	-	<0.5	-	-	-
Allyl chloride	mg/kg	0.1	-	<0.1	-	-	-
Carbon disulfide	mg/kg	0.5	-	<0.5	-	-	-
trans-1,2-dichloroethene	mg/kg	0.1	-	<0.1	-	-	-
MtBE (Methyl-tert-butyl ether)	mg/kg	0.1	-	<0.1	-	-	-
1,1-dichloroethane	mg/kg	0.1	-	<0.1	-	-	-
Vinyl acetate	mg/kg	10	-	<10	-	-	-
MEK (2-butanone)	mg/kg	10	-	<10	-	-	-
cis-1,2-dichloroethene	mg/kg	0.1	-	<0.1	-	-	-
Bromochloromethane	mg/kg	0.1	-	<0.1	-	-	-
Chloroform	mg/kg	0.1	-	<0.1	-	-	-
2,2-dichloropropane	mg/kg	0.1	-	<0.1	-	-	-
1,2-dichloroethane	mg/kg	0.1	-	<0.1	-	-	-
1,1,1-trichloroethane	mg/kg	0.1	-	<0.1	-	-	-
1,1-dichloropropene	mg/kg	0.1	-	<0.1	-	-	-
Carbon tetrachloride	mg/kg	0.1	-	<0.1	-	-	-
Dibromomethane	mg/kg	0.1	-	<0.1	-	-	-
1,2-dichloropropane	mg/kg	0.1	-	<0.1	-	-	-
Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	-	<0.1	-	-	-
2-nitropropane	mg/kg	10	-	<10	-	-	-
Bromodichloromethane	mg/kg	0.1	-	<0.1	-	-	-
MIBK (4-methyl-2-pentanone)	mg/kg	1	-	<1	-	-	-
cis-1,3-dichloropropene	mg/kg	0.1	-	<0.1	-	-	-
trans-1,3-dichloropropene	mg/kg	0.1	-	<0.1	-	-	-
1,1,2-trichloroethane	mg/kg	0.1	-	<0.1	-	-	-
1,3-dichloropropane	mg/kg	0.1	-	<0.1	-	-	-
Chlorodibromomethane	mg/kg	0.1	-	<0.1	-	-	-
2-hexanone (MBK)	mg/kg	5	-	<5	-	-	-
1,2-dibromoethane (EDB)	mg/kg	0.1	-	<0.1	-	-	-
Tetrachloroethene (Perchloroethylene,PCE)	mg/kg	0.1	-	<0.1	-	-	-
1,1,1,2-tetrachloroethane	mg/kg	0.1	-	<0.1	-	-	-
Chlorobenzene	mg/kg	0.1	-	<0.1	-	-	-
Bromoform	mg/kg	0.1	-	<0.1	-	-	-
cis-1,4-dichloro-2-butene	mg/kg	1	-	<1	-	-	-
Styrene (Vinyl benzene)	mg/kg	0.1	-	<0.1	-	-	-
1,1,2,2-tetrachloroethane	mg/kg	0.1	-	<0.1	-	-	-
1,2,3-trichloropropane	mg/kg	0.1	-	<0.1	-	-	-
trans-1,4-dichloro-2-butene	mg/kg	1	-	<1	-	-	-

ANALYTICAL RESULTS SE230272 R0

VOC's in Soil [AN433] Tested: 24/3/2022 (continued)

PARAMETER	UOM	LOR	BH7_0.5-0.6 SOIL - 22/3/2022 SE230272.011	BH8_0.1-0.2 SOIL - 22/3/2022 SE230272.012	BH9_0.7-0.8 SOIL - 22/3/2022 SE230272.013	BH9_1.4-1.5 SOIL - 22/3/2022 SE230272.014	BH10_0.05-0.1 SOIL - 22/3/2022 SE230272.015
Isopropylbenzene (Cumene)	mg/kg	0.1	-	<0.1	-	-	-
Bromobenzene	mg/kg	0.1	-	<0.1	-	-	-
n-propylbenzene	mg/kg	0.1	-	<0.1	-	-	-
2-chlorotoluene	mg/kg	0.1	-	<0.1	-	-	-
4-chlorotoluene	mg/kg	0.1	-	<0.1	-	-	-
1,3,5-trimethylbenzene	mg/kg	0.1	-	<0.1	-	-	-
tert-butylbenzene	mg/kg	0.1	-	<0.1	-	-	-
1,2,4-trimethylbenzene	mg/kg	0.1	-	<0.1	-	-	-
sec-butylbenzene	mg/kg	0.1	-	<0.1	-	-	-
1,3-dichlorobenzene	mg/kg	0.1	-	<0.1	-	-	-
1,4-dichlorobenzene	mg/kg	0.1	-	<0.1	-	-	-
p-isopropyltoluene	mg/kg	0.1	-	<0.1	-	-	-
1,2-dichlorobenzene	mg/kg	0.1	-	<0.1	-	-	-
n-butylbenzene	mg/kg	0.1	-	<0.1	-	-	-
1,2-dibromo-3-chloropropane	mg/kg	0.1	-	<0.1	-	-	-
1,2,4-trichlorobenzene	mg/kg	0.1	-	<0.1	-	-	-
Hexachlorobutadiene	mg/kg	0.1	-	<0.1	-	-	-
1,2,3-trichlorobenzene	mg/kg	0.1	-	<0.1	-	-	-
Total VOC*	mg/kg	24	-	<24	-	-	-
Total Volatile Chlorinated Hydrocarbons*	mg/kg	3	-	<3.0	-	-	-
Total Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	-	<1.8	-	-	-
Total Other Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	-	<1.8	-	-	-

SGS

ANALYTICAL RESULTS SE230272 R0

VOC's in Soil [AN433] Tested: 24/3/2022 (continued)

PARAMETER	UOM	LOR	BH11_0.05-0.1 SOIL - 22/3/2022 SE230272.016	BH12_0.1-0.2 SOIL - 22/3/2022 SE230272.017	BH13_0.2-0.3 SOIL - 22/3/2022 SE230272.018	BH13_0.6-0.7 SOIL - 22/3/2022 SE230272.019	BH14_0.1-0.2 SOIL - 22/3/2022 SE230272.020
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene (VOC)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorodifluoromethane (CFC-12)	mg/kg	1	-	<1	<1	-	<1
Chloromethane	mg/kg	1	-	<1	<1	-	<1
Vinyl chloride (Chloroethene)	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
Bromomethane	mg/kg	1	-	<1	<1	-	<1
Chloroethane	mg/kg	1	-	<1	<1	-	<1
Trichlorofluoromethane	mg/kg	1	-	<1	<1	-	<1
Acetone (2-propanone)	mg/kg	10	-	<10	<10	-	<10
Iodomethane	mg/kg	5	-	<5	<5	-	<5
1,1-dichloroethene	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
Acrylonitrile	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
Dichloromethane (Methylene chloride)	mg/kg	0.5	-	<0.5	<0.5	-	<0.5
Allyl chloride	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
Carbon disulfide	mg/kg	0.5	-	<0.5	<0.5	-	<0.5
trans-1,2-dichloroethene	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
MtBE (Methyl-tert-butyl ether)	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
1,1-dichloroethane	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
Vinyl acetate	mg/kg	10	-	<10	<10	-	<10
MEK (2-butanone)	mg/kg	10	-	<10	<10	-	<10
cis-1,2-dichloroethene	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
Bromochloromethane	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
Chloroform	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
2,2-dichloropropane	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
1,2-dichloroethane	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
1,1,1-trichloroethane	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
1,1-dichloropropene	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
Carbon tetrachloride	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
Dibromomethane	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
1,2-dichloropropane	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
2-nitropropane	mg/kg	10	-	<10	<10	-	<10
Bromodichloromethane	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
MIBK (4-methyl-2-pentanone)	mg/kg	1	-	<1	<1	-	<1
cis-1,3-dichloropropene	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
trans-1,3-dichloropropene	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
1,1,2-trichloroethane	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
1,3-dichloropropane	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
Chlorodibromomethane	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
2-hexanone (MBK)	mg/kg	5	-	<5	<5	-	<5
1,2-dibromoethane (EDB)	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
Tetrachloroethene (Perchloroethylene,PCE)	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
1,1,1,2-tetrachloroethane	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
Chlorobenzene	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
Bromoform	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
cis-1,4-dichloro-2-butene	mg/kg	1	-	<1	<1	-	<1
Styrene (Vinyl benzene)	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
1,1,2,2-tetrachloroethane	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
1,2,3-trichloropropane	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
trans-1,4-dichloro-2-butene	mg/kg	1	-	<1	<1	-	<1

ANALYTICAL RESULTS SE230272 R0

VOC's in Soil [AN433] Tested: 24/3/2022 (continued)

PARAMETER	UOM	LOR	BH11_0.05-0.1 SOIL - 22/3/2022 SE230272.016	BH12_0.1-0.2 SOIL - 22/3/2022 SE230272.017	BH13_0.2-0.3 SOIL - 22/3/2022 SE230272.018	BH13_0.6-0.7 SOIL - 22/3/2022 SE230272.019	BH14_0.1-0.2 SOIL - 22/3/2022 SE230272.020
Isopropylbenzene (Cumene)	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
Bromobenzene	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
n-propylbenzene	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
2-chlorotoluene	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
4-chlorotoluene	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
1,3,5-trimethylbenzene	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
tert-butylbenzene	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
1,2,4-trimethylbenzene	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
sec-butylbenzene	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
1,3-dichlorobenzene	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
1,4-dichlorobenzene	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
p-isopropyltoluene	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
1,2-dichlorobenzene	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
n-butylbenzene	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
1,2-dibromo-3-chloropropane	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
1,2,4-trichlorobenzene	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
Hexachlorobutadiene	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
1,2,3-trichlorobenzene	mg/kg	0.1	-	<0.1	<0.1	-	<0.1
Total VOC*	mg/kg	24	-	<24	<24	-	<24
Total Volatile Chlorinated Hydrocarbons*	mg/kg	3	-	<3.0	<3.0	-	<3.0
Total Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	-	<1.8	<1.8	-	<1.8
Total Other Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	-	<1.8	<1.8	-	<1.8

SGS

ANALYTICAL RESULTS SE230272 R0

VOC's in Soil [AN433] Tested: 24/3/2022 (continued)

PARAMETER	UOM	LOR	BH15_0.2-0.3 SOIL - 22/3/2022 SE230272.021	BH15_0.7-0.8 SOIL - 22/3/2022 SE230272.022	BH16_0.1-0.2 SOIL - 22/3/2022 SE230272.023	BH17_0.2-0.3 SOIL - 22/3/2022 SE230272.024	BH17_0.7-0.8 SOIL - 22/3/2022 SE230272.025
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene (VOC)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorodifluoromethane (CFC-12)	mg/kg	1	<1	-	<1	-	-
Chloromethane	mg/kg	1	<1	-	<1	-	-
Vinyl chloride (Chloroethene)	mg/kg	0.1	<0.1	-	<0.1	-	-
Bromomethane	mg/kg	1	<1	-	<1	-	-
Chloroethane	mg/kg	1	<1	-	<1	-	-
Trichlorofluoromethane	mg/kg	1	<1	-	<1	-	-
Acetone (2-propanone)	mg/kg	10	<10	-	<10	-	-
Iodomethane	mg/kg	5	<5	-	<5	-	-
1,1-dichloroethene	mg/kg	0.1	<0.1	-	<0.1	-	-
Acrylonitrile	mg/kg	0.1	<0.1	-	<0.1	-	-
Dichloromethane (Methylene chloride)	mg/kg	0.5	<0.5	-	<0.5	-	-
Allyl chloride	mg/kg	0.1	<0.1	-	<0.1	-	-
Carbon disulfide	mg/kg	0.5	<0.5	-	<0.5	-	-
trans-1,2-dichloroethene	mg/kg	0.1	<0.1	-	<0.1	-	-
MtBE (Methyl-tert-butyl ether)	mg/kg	0.1	<0.1	-	<0.1	-	-
1,1-dichloroethane	mg/kg	0.1	<0.1	-	<0.1	-	-
Vinyl acetate	mg/kg	10	<10	-	<10	-	-
MEK (2-butanone)	mg/kg	10	<10	-	<10	-	-
cis-1,2-dichloroethene	mg/kg	0.1	<0.1	-	<0.1	-	-
Bromochloromethane	mg/kg	0.1	<0.1	-	<0.1	-	-
Chloroform	mg/kg	0.1	<0.1	-	<0.1	-	-
2,2-dichloropropane	mg/kg	0.1	<0.1	-	<0.1	-	-
1,2-dichloroethane	mg/kg	0.1	<0.1	-	<0.1	-	-
1,1,1-trichloroethane	mg/kg	0.1	<0.1	-	<0.1	-	-
1,1-dichloropropene	mg/kg	0.1	<0.1	-	<0.1	-	-
Carbon tetrachloride	mg/kg	0.1	<0.1	-	<0.1	-	-
Dibromomethane	mg/kg	0.1	<0.1	-	<0.1	-	-
1,2-dichloropropane	mg/kg	0.1	<0.1	-	<0.1	-	-
Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	<0.1	-	<0.1	-	-
2-nitropropane	mg/kg	10	<10	-	<10	-	-
Bromodichloromethane	mg/kg	0.1	<0.1	-	<0.1	-	-
MIBK (4-methyl-2-pentanone)	mg/kg	1	<1	-	<1	-	-
cis-1,3-dichloropropene	mg/kg	0.1	<0.1	-	<0.1	-	-
trans-1,3-dichloropropene	mg/kg	0.1	<0.1	-	<0.1	-	-
1,1,2-trichloroethane	mg/kg	0.1	<0.1	-	<0.1	-	-
1,3-dichloropropane	mg/kg	0.1	<0.1	-	<0.1	-	-
Chlorodibromomethane	mg/kg	0.1	<0.1	-	<0.1	-	-
2-hexanone (MBK)	mg/kg	5	<5	-	<5	-	-
1,2-dibromoethane (EDB)	mg/kg	0.1	<0.1	-	<0.1	-	-
Tetrachloroethene (Perchloroethylene,PCE)	mg/kg	0.1	<0.1	-	<0.1	-	-
1,1,1,2-tetrachloroethane	mg/kg	0.1	<0.1	-	<0.1	-	-
Chlorobenzene	mg/kg	0.1	<0.1	-	<0.1	-	-
Bromoform	mg/kg	0.1	<0.1	-	<0.1	-	-
cis-1,4-dichloro-2-butene	mg/kg	1	<1	-	<1	-	-
Styrene (Vinyl benzene)	mg/kg	0.1	<0.1	-	<0.1	-	-
1,1,2,2-tetrachloroethane	mg/kg	0.1	<0.1	-	<0.1	-	-
1,2,3-trichloropropane	mg/kg	0.1	<0.1	-	<0.1	-	-
trans-1,4-dichloro-2-butene	mg/kg	1	<1	-	<1	-	-

ANALYTICAL RESULTS SE230272 R0

VOC's in Soil [AN433] Tested: 24/3/2022 (continued)

PARAMETER	UOM	LOR	BH15_0.2-0.3 SOIL - 22/3/2022 SE230272.021	BH15_0.7-0.8 SOIL - 22/3/2022 SE230272.022	BH16_0.1-0.2 SOIL - 22/3/2022 SE230272.023	BH17_0.2-0.3 SOIL - 22/3/2022 SE230272.024	BH17_0.7-0.8 SOIL - 22/3/2022 SE230272.025
Isopropylbenzene (Cumene)	mg/kg	0.1	<0.1	-	<0.1	-	-
Bromobenzene	mg/kg	0.1	<0.1	-	<0.1	-	-
n-propylbenzene	mg/kg	0.1	<0.1	-	<0.1	-	-
2-chlorotoluene	mg/kg	0.1	<0.1	-	<0.1	-	-
4-chlorotoluene	mg/kg	0.1	<0.1	-	<0.1	-	-
1,3,5-trimethylbenzene	mg/kg	0.1	<0.1	-	<0.1	-	-
tert-butylbenzene	mg/kg	0.1	<0.1	-	<0.1	-	-
1,2,4-trimethylbenzene	mg/kg	0.1	<0.1	-	<0.1	-	-
sec-butylbenzene	mg/kg	0.1	<0.1	-	<0.1	-	-
1,3-dichlorobenzene	mg/kg	0.1	<0.1	-	<0.1	-	-
1,4-dichlorobenzene	mg/kg	0.1	<0.1	-	<0.1	-	-
p-isopropyltoluene	mg/kg	0.1	<0.1	-	<0.1	-	-
1,2-dichlorobenzene	mg/kg	0.1	<0.1	-	<0.1	-	-
n-butylbenzene	mg/kg	0.1	<0.1	-	<0.1	-	-
1,2-dibromo-3-chloropropane	mg/kg	0.1	<0.1	-	<0.1	-	-
1,2,4-trichlorobenzene	mg/kg	0.1	<0.1	-	<0.1	-	-
Hexachlorobutadiene	mg/kg	0.1	<0.1	-	<0.1	-	-
1,2,3-trichlorobenzene	mg/kg	0.1	<0.1	-	<0.1	-	-
Total VOC*	mg/kg	24	<24	-	<24	-	-
Total Volatile Chlorinated Hydrocarbons*	mg/kg	3	<3.0	-	<3.0	-	-
Total Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	<1.8	-	<1.8	-	-
Total Other Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	<1.8	-	<1.8	-	-

SGS

ANALYTICAL RESULTS SE230272 R0

VOC's in Soil [AN433] Tested: 24/3/2022 (continued)

PARAMETER	UOM	LOR	BH18M_0.1-0.2 SOIL - 22/3/2022 SE230272.026	BH18M_1.1-1.2 SOIL - 22/3/2022 SE230272.027	BH19_0.05-0.1 SOIL - 22/3/2022 SE230272.028	BH20M_0.1-0.2 SOIL - 22/3/2022 SE230272.029	BH20M_1.0-1.1 SOIL - 22/3/2022 SE230272.030
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene (VOC)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorodifluoromethane (CFC-12)	mg/kg	1	-	-	<1	-	-
Chloromethane	mg/kg	1	-	-	<1	-	-
Vinyl chloride (Chloroethene)	mg/kg	0.1	-	-	<0.1	-	-
Bromomethane	mg/kg	1	-	-	<1	-	-
Chloroethane	mg/kg	1	-	-	<1	-	-
Trichlorofluoromethane	mg/kg	1	-	-	<1	-	-
Acetone (2-propanone)	mg/kg	10	-	-	<10	-	-
Iodomethane	mg/kg	5	-	-	<5	-	-
1,1-dichloroethene	mg/kg	0.1	-	-	<0.1	-	-
Acrylonitrile	mg/kg	0.1	-	-	<0.1	-	-
Dichloromethane (Methylene chloride)	mg/kg	0.5	-	-	<0.5	-	-
Allyl chloride	mg/kg	0.1	-	-	<0.1	-	-
Carbon disulfide	mg/kg	0.5	-	-	<0.5	-	-
trans-1,2-dichloroethene	mg/kg	0.1	-	-	<0.1	-	-
MtBE (Methyl-tert-butyl ether)	mg/kg	0.1	-	-	<0.1	-	-
1,1-dichloroethane	mg/kg	0.1	-	-	<0.1	-	-
Vinyl acetate	mg/kg	10	-	-	<10	-	-
MEK (2-butanone)	mg/kg	10	-	-	<10	-	-
cis-1,2-dichloroethene	mg/kg	0.1	-	-	<0.1	-	-
Bromochloromethane	mg/kg	0.1	-	-	<0.1	-	-
Chloroform	mg/kg	0.1	-	-	<0.1	-	-
2,2-dichloropropane	mg/kg	0.1	-	-	<0.1	-	-
1,2-dichloroethane	mg/kg	0.1	-	-	<0.1	-	-
1,1,1-trichloroethane	mg/kg	0.1	-	-	<0.1	-	-
1,1-dichloropropene	mg/kg	0.1	-	-	<0.1	-	-
Carbon tetrachloride	mg/kg	0.1	-	-	<0.1	-	-
Dibromomethane	mg/kg	0.1	-	-	<0.1	-	-
1,2-dichloropropane	mg/kg	0.1	-	-	<0.1	-	-
Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	-	-	<0.1	-	-
2-nitropropane	mg/kg	10	-	-	<10	-	-
Bromodichloromethane	mg/kg	0.1	-	-	<0.1	-	-
MIBK (4-methyl-2-pentanone)	mg/kg	1	-	-	<1	-	-
cis-1,3-dichloropropene	mg/kg	0.1	-	-	<0.1	-	-
trans-1,3-dichloropropene	mg/kg	0.1	-	-	<0.1	-	-
1,1,2-trichloroethane	mg/kg	0.1	-	-	<0.1	-	-
1,3-dichloropropane	mg/kg	0.1	-	-	<0.1	-	-
Chlorodibromomethane	mg/kg	0.1	-	-	<0.1	-	-
2-hexanone (MBK)	mg/kg	5	-	-	<5	-	-
1,2-dibromoethane (EDB)	mg/kg	0.1	-	-	<0.1	-	-
Tetrachloroethene (Perchloroethylene,PCE)	mg/kg	0.1	-	-	<0.1	-	-
1,1,1,2-tetrachloroethane	mg/kg	0.1	-	-	<0.1	-	-
Chlorobenzene	mg/kg	0.1	-	-	<0.1	-	-
Bromoform	mg/kg	0.1	-	-	<0.1	-	-
cis-1,4-dichloro-2-butene	mg/kg	1	-	-	<1	-	-
Styrene (Vinyl benzene)	mg/kg	0.1	-	-	<0.1	-	-
1,1,2,2-tetrachloroethane	mg/kg	0.1	-	-	<0.1	-	-
1,2,3-trichloropropane	mg/kg	0.1	-	-	<0.1	-	-
trans-1,4-dichloro-2-butene	mg/kg	1	-	-	<1	-	-

SGS

ANALYTICAL RESULTS SE230272 R0

VOC's in Soil [AN433] Tested: 24/3/2022 (continued)

PARAMETER	UOM	LOR	BH18M_0.1-0.2 SOIL - 22/3/2022 SE230272.026	BH18M_1.1-1.2 SOIL - 22/3/2022 SE230272.027	BH19_0.05-0.1 SOIL - 22/3/2022 SE230272.028	BH20M_0.1-0.2 SOIL - 22/3/2022 SE230272.029	BH20M_1.0-1.1 SOIL - 22/3/2022 SE230272.030
Isopropylbenzene (Cumene)	mg/kg	0.1	-	-	<0.1	-	-
Bromobenzene	mg/kg	0.1	-	-	<0.1	-	-
n-propylbenzene	mg/kg	0.1	-	-	<0.1	-	-
2-chlorotoluene	mg/kg	0.1	-	-	<0.1	-	-
4-chlorotoluene	mg/kg	0.1	-	-	<0.1	-	-
1,3,5-trimethylbenzene	mg/kg	0.1	-	-	<0.1	-	-
tert-butylbenzene	mg/kg	0.1	-	-	<0.1	-	-
1,2,4-trimethylbenzene	mg/kg	0.1	-	-	<0.1	-	-
sec-butylbenzene	mg/kg	0.1	-	-	<0.1	-	-
1,3-dichlorobenzene	mg/kg	0.1	-	-	<0.1	-	-
1,4-dichlorobenzene	mg/kg	0.1	-	-	<0.1	-	-
p-isopropyltoluene	mg/kg	0.1	-	-	<0.1	-	-
1,2-dichlorobenzene	mg/kg	0.1	-	-	<0.1	-	-
n-butylbenzene	mg/kg	0.1	-	-	<0.1	-	-
1,2-dibromo-3-chloropropane	mg/kg	0.1	-	-	<0.1	-	-
1,2,4-trichlorobenzene	mg/kg	0.1	-	-	<0.1	-	-
Hexachlorobutadiene	mg/kg	0.1	-	-	<0.1	-	-
1,2,3-trichlorobenzene	mg/kg	0.1	-	-	<0.1	-	-
Total VOC*	mg/kg	24	-	-	<24	-	-
Total Volatile Chlorinated Hydrocarbons*	mg/kg	3	-	-	<3.0	-	-
Total Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	-	-	<1.8	-	-
Total Other Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	-	-	<1.8	-	-

SGS

ANALYTICAL RESULTS SE230272 R0

VOC's in Soil [AN433] Tested: 24/3/2022 (continued)

PARAMETER	UOM	LOR	QD1 SOIL - 22/3/2022 SE230272.031	QTB SOIL - 22/3/2022 SE230272.033	QTS SOIL - 22/3/2022 SE230272.034
Benzene	mg/kg	0.1	<0.1	<0.1	[95%]
Toluene	mg/kg	0.1	<0.1	<0.1	[100%]
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	[99%]
m/p-xylene	mg/kg	0.2	<0.2	<0.2	[97%]
o-xylene	mg/kg	0.1	<0.1	<0.1	[98%]
Total Xylenes	mg/kg	0.3	<0.3	<0.3	-
Total BTEX	mg/kg	0.6	<0.6	<0.6	-
Naphthalene (VOC)	mg/kg	0.1	<0.1	<0.1	-
Dichlorodifluoromethane (CFC-12)	mg/kg	1	-	-	-
Chloromethane	mg/kg	1	-	-	-
Vinyl chloride (Chloroethene)	mg/kg	0.1	-	-	-
Bromomethane	mg/kg	1	-	-	-
Chloroethane	mg/kg	1	-	-	-
Trichlorofluoromethane	mg/kg	1	-	-	-
Acetone (2-propanone)	mg/kg	10	-	-	-
Iodomethane	mg/kg	5	-	-	-
1,1-dichloroethene	mg/kg	0.1	-	-	-
Acrylonitrile	mg/kg	0.1	-	-	-
Dichloromethane (Methylene chloride)	mg/kg	0.5	-	-	-
Allyl chloride	mg/kg	0.1	-	-	-
Carbon disulfide	mg/kg	0.5	-	-	-
trans-1,2-dichloroethene	mg/kg	0.1	-	-	-
MtBE (Methyl-tert-butyl ether)	mg/kg	0.1	-	-	-
1,1-dichloroethane	mg/kg	0.1	-	-	-
Vinyl acetate	mg/kg	10	-	-	-
MEK (2-butanone)	mg/kg	10	-	-	-
cis-1,2-dichloroethene	mg/kg	0.1	-	-	-
Bromochloromethane	mg/kg	0.1	-	-	-
Chloroform	mg/kg	0.1	-	-	-
2,2-dichloropropane	mg/kg	0.1	-	-	-
1,2-dichloroethane	mg/kg	0.1	-	-	-
1,1,1-trichloroethane	mg/kg	0.1	-	-	-
1,1-dichloropropene	mg/kg	0.1	-	-	-
Carbon tetrachloride	mg/kg	0.1	-	-	-
Dibromomethane	mg/kg	0.1	-	-	-
1,2-dichloropropane	mg/kg	0.1	-	-	-
Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	-	-	-
2-nitropropane	mg/kg	10	-	-	-
Bromodichloromethane	mg/kg	0.1	-	-	-
MIBK (4-methyl-2-pentanone)	mg/kg	1	-	-	-
cis-1,3-dichloropropene	mg/kg	0.1	-	-	-
trans-1,3-dichloropropene	mg/kg	0.1	-	-	-
1,1,2-trichloroethane	mg/kg	0.1	-	-	-
1,3-dichloropropane	mg/kg	0.1	-	-	-
Chlorodibromomethane	mg/kg	0.1	-	-	-
2-hexanone (MBK)	mg/kg	5	-	-	-
1,2-dibromoethane (EDB)	mg/kg	0.1	-	-	-
Tetrachloroethene (Perchloroethylene,PCE)	mg/kg	0.1	-	-	-
1,1,1,2-tetrachloroethane	mg/kg	0.1	-	-	-
Chlorobenzene	mg/kg	0.1	-	-	-
Bromoform	mg/kg	0.1	-	-	-
cis-1,4-dichloro-2-butene	mg/kg	1	-	-	-
Styrene (Vinyl benzene)	mg/kg	0.1	-	-	-
1,1,2,2-tetrachloroethane	mg/kg	0.1	-	-	-
1,2,3-trichloropropane	mg/kg	0.1	-	-	-
trans-1,4-dichloro-2-butene	mg/kg	1	-	-	-

SGS

ANALYTICAL RESULTS SE230272 R0

VOC's in Soil [AN433] Tested: 24/3/2022 (continued)

PARAMETER	UOM	LOR	QD1 SOIL - 22/3/2022 SE230272.031	QTB SOIL - 22/3/2022 SE230272.033	QTS SOIL - 22/3/2022 SE230272.034
Isopropylbenzene (Cumene)	mg/kg	0.1	-	-	-
Bromobenzene	mg/kg	0.1	-	-	-
n-propylbenzene	mg/kg	0.1	-	-	-
2-chlorotoluene	mg/kg	0.1	-	-	-
4-chlorotoluene	mg/kg	0.1	-	-	-
1,3,5-trimethylbenzene	mg/kg	0.1	-	-	-
tert-butylbenzene	mg/kg	0.1	-	-	-
1,2,4-trimethylbenzene	mg/kg	0.1	-	-	-
sec-butylbenzene	mg/kg	0.1	-	-	-
1,3-dichlorobenzene	mg/kg	0.1	-	-	-
1,4-dichlorobenzene	mg/kg	0.1	-	-	-
p-isopropyltoluene	mg/kg	0.1	-	-	-
1,2-dichlorobenzene	mg/kg	0.1	-	-	-
n-butylbenzene	mg/kg	0.1	-	-	-
1,2-dibromo-3-chloropropane	mg/kg	0.1	-	-	-
1,2,4-trichlorobenzene	mg/kg	0.1	-	-	-
Hexachlorobutadiene	mg/kg	0.1	-	-	-
1,2,3-trichlorobenzene	mg/kg	0.1	-	-	-
Total VOC*	mg/kg	24	-	-	-
Total Volatile Chlorinated Hydrocarbons*	mg/kg	3	-	-	-
Total Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	-	-	-
Total Other Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	-	-	-

SGS

ANALYTICAL RESULTS SE230272 R0

Volatile Petroleum Hydrocarbons in Soil [AN433] Tested: 24/3/2022

PARAMETER	UOM	LOR	BH1_0.1-0.2 SOIL - 22/3/2022 SE230272.001	BH1_1.5-1.6 SOIL - 22/3/2022 SE230272.002	BH2M_0.4-0.5 SOIL - 22/3/2022 SE230272.003	BH3_0.2-0.3 SOIL - 22/3/2022 SE230272.004	BH4_0.7-0.8 SOIL - 22/3/2022 SE230272.005
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25	<25

PARAMETER	UOM	LOR	BH4_1.3-1.4 SOIL - 22/3/2022 SE230272.006	BH5_0.4-0.5 SOIL - 22/3/2022 SE230272.007	BH5_0.9-1.0 SOIL - 22/3/2022 SE230272.008	BH5_1.4-1.5 SOIL - 22/3/2022 SE230272.009	BH6_0.2-0.3 SOIL - 22/3/2022 SE230272.010
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25	<25

PARAMETER	UOM	LOR	BH7_0.5-0.6 SOIL - 22/3/2022 SE230272.011	BH8_0.1-0.2 SOIL - 22/3/2022 SE230272.012	BH9_0.7-0.8 SOIL - 22/3/2022 SE230272.013	BH9_1.4-1.5 SOIL - 22/3/2022 SE230272.014	BH10_0.05-0.1 SOIL - 22/3/2022 SE230272.015
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25	<25

PARAMETER	UOM	LOR	BH11_0.05-0.1 SOIL - 22/3/2022 SE230272.016	BH12_0.1-0.2 SOIL - 22/3/2022 SE230272.017	BH13_0.2-0.3 SOIL - 22/3/2022 SE230272.018	BH13_0.6-0.7 SOIL - 22/3/2022 SE230272.019	BH14_0.1-0.2 SOIL - 22/3/2022 SE230272.020
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25	<25

PARAMETER	UOM	LOR	BH15_0.2-0.3 SOIL - 22/3/2022 SE230272.021	BH15_0.7-0.8 SOIL - 22/3/2022 SE230272.022	BH16_0.1-0.2 SOIL - 22/3/2022 SE230272.023	BH17_0.2-0.3 SOIL - 22/3/2022 SE230272.024	BH17_0.7-0.8 SOIL - 22/3/2022 SE230272.025
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25	<25

PARAMETER	UOM	LOR	BH18M_0.1-0.2 SOIL - 22/3/2022 SE230272.026	BH18M_1.1-1.2 SOIL - 22/3/2022 SE230272.027	BH19_0.05-0.1 SOIL - 22/3/2022 SE230272.028	BH20M_0.1-0.2 SOIL - 22/3/2022 SE230272.029	BH20M_1.0-1.1 SOIL - 22/3/2022 SE230272.030
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25	<25

SGS ANALYTICAL RESULTS SE230272 R0

Volatile Petroleum Hydrocarbons in Soil [AN433] Tested: 24/3/2022 (continued)

PARAMETER	UOM	LOR	QD1 SOIL - 22/3/2022 SE230272.031
TRH C6-C9	mg/kg	20	<20
Benzene (F0)	mg/kg	0.1	<0.1
TRH C6-C10	mg/kg	25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25

SGS

ANALYTICAL RESULTS SE230272 R0

TRH (Total Recoverable Hydrocarbons) in Soil [AN403] Tested: 24/3/2022

PARAMETER	UOM	LOR	BH1_0.1-0.2 SOIL - 22/3/2022 SE230272.001	BH1_1.5-1.6 SOIL - 22/3/2022 SE230272.002	BH2M_0.4-0.5 SOIL - 22/3/2022 SE230272.003	BH3_0.2-0.3 SOIL - 22/3/2022 SE230272.004	BH4_0.7-0.8 SOIL - 22/3/2022 SE230272.005
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	**160**	**170**	**300**
TRH C29-C36	mg/kg	45	<45	<45	**59**	**67**	**140**
TRH C37-C40	mg/kg	100	<100	<100	<100	<100	<100
TRH >C10-C16	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	**220**	**220**	**420**
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	**220**	**230**	**440**
TRH >C10-C40 Total (F bands)	mg/kg	210	<210	<210	**220**	**220**	**420**

PARAMETER	UOM	LOR	BH4_1.3-1.4 SOIL - 22/3/2022 SE230272.006	BH5_0.4-0.5 SOIL - 22/3/2022 SE230272.007	BH5_0.9-1.0 SOIL - 22/3/2022 SE230272.008	BH5_1.4-1.5 SOIL - 22/3/2022 SE230272.009	BH6_0.2-0.3 SOIL - 22/3/2022 SE230272.010
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	**84**	<45	**220**
TRH C29-C36	mg/kg	45	<45	<45	**67**	<45	**90**
TRH C37-C40	mg/kg	100	<100	<100	<100	<100	<100
TRH >C10-C16	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	**140**	<90	**300**
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	**150**	<110	**310**
TRH >C10-C40 Total (F bands)	mg/kg	210	<210	<210	<210	<210	**300**

PARAMETER	UOM	LOR	BH7_0.5-0.6 SOIL - 22/3/2022 SE230272.011	BH8_0.1-0.2 SOIL - 22/3/2022 SE230272.012	BH9_0.7-0.8 SOIL - 22/3/2022 SE230272.013	BH9_1.4-1.5 SOIL - 22/3/2022 SE230272.014	BH10_0.05-0.1 SOIL - 22/3/2022 SE230272.015
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	**320**	<45	<45
TRH C29-C36	mg/kg	45	<45	<45	**180**	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100	<100
TRH >C10-C16	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	**480**	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	**490**	<110	<110
TRH >C10-C40 Total (F bands)	mg/kg	210	<210	<210	**480**	<210	<210

SGS

ANALYTICAL RESULTS SE230272 R0

TRH (Total Recoverable Hydrocarbons) in Soil [AN403] Tested: 24/3/2022 (continued)

PARAMETER	UOM	LOR	BH11_0.05-0.1 SOIL - 22/3/2022 SE230272.016	BH12_0.1-0.2 SOIL - 22/3/2022 SE230272.017	BH13_0.2-0.3 SOIL - 22/3/2022 SE230272.018	BH13_0.6-0.7 SOIL - 22/3/2022 SE230272.019	BH14_0.1-0.2 SOIL - 22/3/2022 SE230272.020
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45	**60**
TRH C29-C36	mg/kg	45	<45	<45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100	<100
TRH >C10-C16	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90	**97**
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110	<110
TRH >C10-C40 Total (F bands)	mg/kg	210	<210	<210	<210	<210	<210

PARAMETER	UOM	LOR	BH15_0.2-0.3 SOIL - 22/3/2022 SE230272.021	BH15_0.7-0.8 SOIL - 22/3/2022 SE230272.022	BH16_0.1-0.2 SOIL - 22/3/2022 SE230272.023	BH17_0.2-0.3 SOIL - 22/3/2022 SE230272.024	BH17_0.7-0.8 SOIL - 22/3/2022 SE230272.025
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	**190**	<45	**59**	**52**	<45
TRH C29-C36	mg/kg	45	**440**	<45	<45	**56**	<45
TRH C37-C40	mg/kg	100	**120**	<100	<100	<100	<100
TRH >C10-C16	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	**540**	<90	**97**	**110**	<90
TRH >C34-C40 (F4)	mg/kg	120	**290**	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	**630**	<110	<110	<110	<110
TRH >C10-C40 Total (F bands)	mg/kg	210	**830**	<210	<210	<210	<210

PARAMETER	UOM	LOR	BH18M_0.1-0.2 SOIL - 22/3/2022 SE230272.026	BH18M_1.1-1.2 SOIL - 22/3/2022 SE230272.027	BH19_0.05-0.1 SOIL - 22/3/2022 SE230272.028	BH20M_0.1-0.2 SOIL - 22/3/2022 SE230272.029	BH20M_1.0-1.1 SOIL - 22/3/2022 SE230272.030
TRH C10-C14	mg/kg	20	<20	<20	<20	**25**	<20
TRH C15-C28	mg/kg	45	<45	<45	**84**	**98**	<45
TRH C29-C36	mg/kg	45	<45	<45	**67**	**56**	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100	<100
TRH >C10-C16	mg/kg	25	<25	<25	<25	**33**	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25	**33**	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	**140**	**150**	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	**150**	**180**	<110
TRH >C10-C40 Total (F bands)	mg/kg	210	<210	<210	<210	<210	<210

SGS ANALYTICAL RESULTS SE230272 R0

TRH (Total Recoverable Hydrocarbons) in Soil [AN403] Tested: 24/3/2022 (continued)

PARAMETER	UOM	LOR	QD1 SOIL - 22/3/2022 SE230272.031
TRH C10-C14	mg/kg	20	<20
TRH C15-C28	mg/kg	45	**88**
TRH C29-C36	mg/kg	45	<45
TRH C37-C40	mg/kg	100	<100
TRH >C10-C16	mg/kg	25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25
TRH >C16-C34 (F3)	mg/kg	90	**110**
TRH >C34-C40 (F4)	mg/kg	120	<120
TRH C10-C36 Total	mg/kg	110	<110
TRH >C10-C40 Total (F bands)	mg/kg	210	<210

SGS

ANALYTICAL RESULTS SE230272 R0

PAH (Polynuclear Aromatic Hydrocarbons) in Soil [AN420] Tested: 24/3/2022

PARAMETER	UOM	LOR	BH1_0.1-0.2 SOIL - 22/3/2022 SE230272.001	BH1_1.5-1.6 SOIL - 22/3/2022 SE230272.002	BH2M_0.4-0.5 SOIL - 22/3/2022 SE230272.003	BH3_0.2-0.3 SOIL - 22/3/2022 SE230272.004	BH4_0.7-0.8 SOIL - 22/3/2022 SE230272.005
Naphthalene	mg/kg	0.1	<0.1	<0.1	0.4	0.3	0.5
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	0.1	0.1	0.2
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	0.1	<0.1	0.3
Acenaphthylene	mg/kg	0.1	0.3	<0.1	1.9	1.5	3.0
Acenaphthene	mg/kg	0.1	<0.1	<0.1	0.1	<0.1	0.3
Fluorene	mg/kg	0.1	0.1	<0.1	1.0	0.7	2.0
Phenanthrene	mg/kg	0.1	1.3	<0.1	10	7.3	15
Anthracene	mg/kg	0.1	0.5	<0.1	3.3	2.3	4.7
Fluoranthene	mg/kg	0.1	2.8	<0.1	14	11	20
Pyrene	mg/kg	0.1	2.5	<0.1	12	8.9	17
Benzo(a)anthracene	mg/kg	0.1	1.2	<0.1	6.6	5.0	9.8
Chrysene	mg/kg	0.1	1.1	<0.1	7.0	5.1	10
Benzo(b&j)fluoranthene	mg/kg	0.1	1.1	<0.1	6.7	5.0	9.9
Benzo(k)fluoranthene	mg/kg	0.1	0.5	<0.1	3.0	2.2	4.2
Benzo(a)pyrene	mg/kg	0.1	0.9	<0.1	5.7	4.3	8.5
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	0.6	<0.1	3.6	2.7	4.6
Dibenzo(ah)anthracene	mg/kg	0.1	0.1	<0.1	0.8	0.6	1.1
Benzo(ghi)perylene	mg/kg	0.1	0.5	<0.1	3.1	2.3	4.4
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	1.4	<0.2	8.6	6.5	13
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	1.4	<0.3	8.6	6.5	13
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	1.4	<0.2	8.6	6.5	13
Total PAH (18)	mg/kg	0.8	14	<0.8	79	59	120
Total PAH (NEPM/WHO 16)	mg/kg	0.8	14	<0.8	79	59	120

PARAMETER	UOM	LOR	BH4_1.3-1.4 SOIL - 22/3/2022 SE230272.006	BH5_0.4-0.5 SOIL - 22/3/2022 SE230272.007	BH5_0.9-1.0 SOIL - 22/3/2022 SE230272.008	BH5_1.4-1.5 SOIL - 22/3/2022 SE230272.009	BH6_0.2-0.3 SOIL - 22/3/2022 SE230272.010
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.4
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.2
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.2
Acenaphthylene	mg/kg	0.1	<0.1	0.5	0.4	<0.1	2.6
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.2
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	1.5
Phenanthrene	mg/kg	0.1	<0.1	0.8	1.1	<0.1	14
Anthracene	mg/kg	0.1	<0.1	0.4	0.4	<0.1	4.2
Fluoranthene	mg/kg	0.1	<0.1	2.4	2.4	<0.1	18
Pyrene	mg/kg	0.1	<0.1	2.5	2.3	<0.1	16
Benzo(a)anthracene	mg/kg	0.1	<0.1	1.3	1.2	<0.1	8.8
Chrysene	mg/kg	0.1	<0.1	1.4	1.1	<0.1	9.5
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	1.5	1.1	<0.1	9.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	0.6	0.5	<0.1	4.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	1.3	1.0	<0.1	8.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	0.9	0.6	<0.1	5.0
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	0.2	0.1	<0.1	1.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	0.8	0.5	<0.1	4.3
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	2.0	1.5	<0.2	12
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	2.0	1.5	<0.3	12
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	2.0	1.5	<0.2	12
Total PAH (18)	mg/kg	0.8	<0.8	15	13	<0.8	110
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	15	13	<0.8	110

SGS

ANALYTICAL RESULTS SE230272 R0

PAH (Polynuclear Aromatic Hydrocarbons) in Soil [AN420] Tested: 24/3/2022 (continued)

PARAMETER	UOM	LOR	BH7_0.5-0.6 SOIL - 22/3/2022 SE230272.011	BH8_0.1-0.2 SOIL - 22/3/2022 SE230272.012	BH9_0.7-0.8 SOIL - 22/3/2022 SE230272.013	BH9_1.4-1.5 SOIL - 22/3/2022 SE230272.014	BH10_0.05-0.1 SOIL - 22/3/2022 SE230272.015
Naphthalene	mg/kg	0.1	<0.1	<0.1	**0.3**	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	**0.1**	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	**0.1**	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	**0.3**	**1.6**	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	**0.3**	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	**0.2**	**0.9**	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	**2.1**	**9.6**	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	**0.6**	**2.6**	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	**3.0**	**14**	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	**2.7**	**13**	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	**1.4**	**6.6**	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	**1.4**	**7.9**	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	**1.4**	**7.9**	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	**0.6**	**3.4**	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	**1.2**	**6.8**	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	**0.8**	**4.4**	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	**0.2**	**0.7**	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	**0.7**	**4.0**	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	**1.8**	**9.9**	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	**1.8**	**9.9**	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	**1.8**	**9.9**	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	**16**	**84**	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	**16**	**84**	<0.8	<0.8

PARAMETER	UOM	LOR	BH11_0.05-0.1 SOIL - 22/3/2022 SE230272.016	BH12_0.1-0.2 SOIL - 22/3/2022 SE230272.017	BH13_0.2-0.3 SOIL - 22/3/2022 SE230272.018	BH13_0.6-0.7 SOIL - 22/3/2022 SE230272.019	BH14_0.1-0.2 SOIL - 22/3/2022 SE230272.020
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	**0.2**	<0.1	**0.4**
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	**0.1**
Phenanthrene	mg/kg	0.1	<0.1	<0.1	**1.9**	<0.1	**2.9**
Anthracene	mg/kg	0.1	<0.1	<0.1	**0.4**	<0.1	**0.7**
Fluoranthene	mg/kg	0.1	**0.2**	<0.1	**4.1**	<0.1	**6.3**
Pyrene	mg/kg	0.1	**0.2**	<0.1	**3.6**	<0.1	**5.6**
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	**1.6**	<0.1	**2.7**
Chrysene	mg/kg	0.1	**0.1**	<0.1	**1.9**	<0.1	**3.2**
Benzo(b&j)fluoranthene	mg/kg	0.1	**0.1**	<0.1	**1.9**	<0.1	**3.3**
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	**0.8**	<0.1	**1.4**
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	**1.6**	<0.1	**2.7**
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	**1.2**	<0.1	**2.0**
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	**0.2**	<0.1	**0.4**
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	**1.1**	<0.1	**1.9**
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	<0.2	**2.4**	<0.2	**4.1**
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	**2.4**	<0.3	**4.1**
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	**2.4**	<0.2	**4.1**
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	**20**	<0.8	**34**
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	**20**	<0.8	**34**

SGS

ANALYTICAL RESULTS SE230272 R0

PAH (Polynuclear Aromatic Hydrocarbons) in Soil [AN420] Tested: 24/3/2022 (continued)

PARAMETER	UOM	LOR	BH15_0.2-0.3 SOIL - 22/3/2022 SE230272.021	BH15_0.7-0.8 SOIL - 22/3/2022 SE230272.022	BH16_0.1-0.2 SOIL - 22/3/2022 SE230272.023	BH17_0.2-0.3 SOIL - 22/3/2022 SE230272.024	BH17_0.7-0.8 SOIL - 22/3/2022 SE230272.025
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	**0.4**	**0.2**	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	**0.1**	<0.1	<0.1
Phenanthrene	mg/kg	0.1	**0.5**	<0.1	**2.2**	**1.0**	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	**0.5**	**0.2**	<0.1
Fluoranthene	mg/kg	0.1	**1.1**	<0.1	**5.1**	**2.1**	<0.1
Pyrene	mg/kg	0.1	**0.9**	<0.1	**4.4**	**1.8**	<0.1
Benzo(a)anthracene	mg/kg	0.1	**0.5**	<0.1	**2.4**	**1.1**	<0.1
Chrysene	mg/kg	0.1	**0.5**	<0.1	**2.5**	**1.1**	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	**0.5**	<0.1	**2.8**	**1.2**	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	**0.2**	<0.1	**1.1**	**0.5**	<0.1
Benzo(a)pyrene	mg/kg	0.1	**0.5**	<0.1	**2.3**	**1.0**	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	**0.3**	<0.1	**1.6**	**0.6**	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	**0.3**	**0.2**	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	**1.5**	**0.6**	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	**0.6**	<0.2	**3.5**	**1.5**	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	**0.7**	<0.3	**3.5**	**1.5**	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	**0.7**	<0.2	**3.5**	**1.5**	<0.2
Total PAH (18)	mg/kg	0.8	**5.1**	<0.8	**27**	**11**	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	**5.1**	<0.8	**27**	**11**	<0.8

PARAMETER	UOM	LOR	BH18M_0.1-0.2 SOIL - 22/3/2022 SE230272.026	BH18M_1.1-1.2 SOIL - 22/3/2022 SE230272.027	BH19_0.05-0.1 SOIL - 22/3/2022 SE230272.028	BH20M_0.1-0.2 SOIL - 22/3/2022 SE230272.029	BH20M_1.0-1.1 SOIL - 22/3/2022 SE230272.030
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	**0.1**	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	**0.3**	<0.1	**0.4**	**0.5**	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	**0.1**	<0.1
Phenanthrene	mg/kg	0.1	**1.3**	<0.1	**2.7**	**2.8**	<0.1
Anthracene	mg/kg	0.1	**0.3**	<0.1	**0.5**	**0.6**	<0.1
Fluoranthene	mg/kg	0.1	**4.1**	**0.2**	**7.9**	**6.8**	<0.1
Pyrene	mg/kg	0.1	**3.7**	**0.2**	**7.2**	**6.0**	<0.1
Benzo(a)anthracene	mg/kg	0.1	**1.7**	**0.1**	**3.5**	**2.9**	<0.1
Chrysene	mg/kg	0.1	**2.2**	**0.1**	**4.2**	**3.1**	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	**2.6**	**0.2**	**4.8**	**3.6**	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	**1.0**	<0.1	**1.8**	**1.4**	<0.1
Benzo(a)pyrene	mg/kg	0.1	**2.1**	**0.1**	**4.0**	**3.0**	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	**1.6**	**0.1**	**2.9**	**2.1**	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	**0.3**	<0.1	**0.5**	**0.4**	<0.1
Benzo(ghi)perylene	mg/kg	0.1	**1.5**	**0.1**	**2.8**	**2.0**	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	**3.2**	<0.2	**5.9**	**4.5**	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	**3.2**	<0.3	**5.9**	**4.5**	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	**3.2**	**0.2**	**5.9**	**4.5**	<0.2
Total PAH (18)	mg/kg	0.8	**23**	**1.3**	**43**	**35**	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	**23**	**1.3**	**43**	**35**	<0.8

SGS

ANALYTICAL RESULTS SE230272 R0

OC Pesticides in Soil [AN420] Tested: 24/3/2022

PARAMETER	UOM	LOR	BH1_0.1-0.2 SOIL - 22/3/2022 SE230272.001	BH2M_0.4-0.5 SOIL - 22/3/2022 SE230272.003	BH3_0.2-0.3 SOIL - 22/3/2022 SE230272.004	BH4_0.7-0.8 SOIL - 22/3/2022 SE230272.005	BH5_0.4-0.5 SOIL - 22/3/2022 SE230272.007
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	<1	<1
Total OC VIC EPA	mg/kg	1	<1	<1	<1	<1	<1

SGS

ANALYTICAL RESULTS SE230272 R0

OC Pesticides in Soil [AN420] Tested: 24/3/2022 (continued)

PARAMETER	UOM	LOR	BH5_0.9-1.0 SOIL - 22/3/2022 SE230272.008	BH6_0.2-0.3 SOIL - 22/3/2022 SE230272.010	BH7_0.5-0.6 SOIL - 22/3/2022 SE230272.011	BH8_0.1-0.2 SOIL - 22/3/2022 SE230272.012	BH9_0.7-0.8 SOIL - 22/3/2022 SE230272.013
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	<1	<1
Total OC VIC EPA	mg/kg	1	<1	<1	<1	<1	<1

SGS

ANALYTICAL RESULTS SE230272 R0

OC Pesticides in Soil [AN420] Tested: 24/3/2022 (continued)

PARAMETER	UOM	LOR	BH10_0.05-0.1 SOIL - 22/3/2022 SE230272.015	BH11_0.05-0.1 SOIL - 22/3/2022 SE230272.016	BH12_0.1-0.2 SOIL - 22/3/2022 SE230272.017	BH13_0.2-0.3 SOIL - 22/3/2022 SE230272.018	BH14_0.1-0.2 SOIL - 22/3/2022 SE230272.020
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	<1	<1
Total OC VIC EPA	mg/kg	1	<1	<1	<1	<1	<1

SGS

ANALYTICAL RESULTS SE230272 R0

OC Pesticides in Soil [AN420] Tested: 24/3/2022 (continued)

PARAMETER	UOM	LOR	BH15_0.2-0.3 SOIL - 22/3/2022 SE230272.021	BH16_0.1-0.2 SOIL - 22/3/2022 SE230272.023	BH17_0.2-0.3 SOIL - 22/3/2022 SE230272.024	BH18M_0.1-0.2 SOIL - 22/3/2022 SE230272.026	BH19_0.05-0.1 SOIL - 22/3/2022 SE230272.028
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	<1	<1
Total OC VIC EPA	mg/kg	1	<1	<1	<1	<1	<1

SGS

ANALYTICAL RESULTS SE230272 R0

OC Pesticides in Soil [AN420] Tested: 24/3/2022 (continued)

PARAMETER	UOM	LOR	BH20M_0.1-0.2 SOIL - 22/3/2022 SE230272.029
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1
Lindane	mg/kg	0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1
Aldrin	mg/kg	0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2
Endrin	mg/kg	0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1
Isodrin	mg/kg	0.1	<0.1
Mirex	mg/kg	0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1
Total OC VIC EPA	mg/kg	1	<1

SGS

ANALYTICAL RESULTS SE230272 R0

OP Pesticides in Soil [AN420] Tested: 24/3/2022

PARAMETER	UOM	LOR	BH1_0.1-0.2 SOIL - 22/3/2022 SE230272.001	BH2M_0.4-0.5 SOIL - 22/3/2022 SE230272.003	BH3_0.2-0.3 SOIL - 22/3/2022 SE230272.004	BH4_0.7-0.8 SOIL - 22/3/2022 SE230272.005	BH5_0.4-0.5 SOIL - 22/3/2022 SE230272.007
Dichlorvos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	<1.7	<1.7	<1.7

PARAMETER	UOM	LOR	BH5_0.9-1.0 SOIL - 22/3/2022 SE230272.008	BH6_0.2-0.3 SOIL - 22/3/2022 SE230272.010	BH7_0.5-0.6 SOIL - 22/3/2022 SE230272.011	BH8_0.1-0.2 SOIL - 22/3/2022 SE230272.012	BH9_0.7-0.8 SOIL - 22/3/2022 SE230272.013
Dichlorvos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	<1.7	<1.7	<1.7

PARAMETER	UOM	LOR	BH10_0.05-0.1 SOIL - 22/3/2022 SE230272.015	BH11_0.05-0.1 SOIL - 22/3/2022 SE230272.016	BH12_0.1-0.2 SOIL - 22/3/2022 SE230272.017	BH13_0.2-0.3 SOIL - 22/3/2022 SE230272.018	BH14_0.1-0.2 SOIL - 22/3/2022 SE230272.020
Dichlorvos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	<1.7	<1.7	<1.7

SGS ANALYTICAL RESULTS SE230272 R0

OP Pesticides in Soil [AN420] Tested: 24/3/2022 (continued)

PARAMETER	UOM	LOR	BH15_0.2-0.3 SOIL - 22/3/2022 SE230272.021	BH16_0.1-0.2 SOIL - 22/3/2022 SE230272.023	BH17_0.2-0.3 SOIL - 22/3/2022 SE230272.024	BH18M_0.1-0.2 SOIL - 22/3/2022 SE230272.026	BH19_0.05-0.1 SOIL - 22/3/2022 SE230272.028
Dichlorvos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	<1.7	<1.7	<1.7

PARAMETER	UOM	LOR	BH20M_0.1-0.2 SOIL - 22/3/2022 SE230272.029
Dichlorvos	mg/kg	0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2
Malathion	mg/kg	0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2
Methidathion	mg/kg	0.5	<0.5
Ethion	mg/kg	0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2
Total OP Pesticides*	mg/kg	1.7	<1.7

SGS

ANALYTICAL RESULTS SE230272 R0

PCBs in Soil [AN420] Tested: 24/3/2022

PARAMETER	UOM	LOR	BH1_0.1-0.2 SOIL - 22/3/2022 SE230272.001	BH2M_0.4-0.5 SOIL - 22/3/2022 SE230272.003	BH3_0.2-0.3 SOIL - 22/3/2022 SE230272.004	BH4_0.7-0.8 SOIL - 22/3/2022 SE230272.005	BH5_0.4-0.5 SOIL - 22/3/2022 SE230272.007
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1	<1	<1	<1

PARAMETER	UOM	LOR	BH5_0.9-1.0 SOIL - 22/3/2022 SE230272.008	BH6_0.2-0.3 SOIL - 22/3/2022 SE230272.010	BH8_0.1-0.2 SOIL - 22/3/2022 SE230272.012	BH9_0.7-0.8 SOIL - 22/3/2022 SE230272.013	BH10_0.05-0.1 SOIL - 22/3/2022 SE230272.015
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1	<1	<1	<1

PARAMETER	UOM	LOR	BH11_0.05-0.1 SOIL - 22/3/2022 SE230272.016	BH12_0.1-0.2 SOIL - 22/3/2022 SE230272.017	BH13_0.2-0.3 SOIL - 22/3/2022 SE230272.018	BH14_0.1-0.2 SOIL - 22/3/2022 SE230272.020	BH15_0.2-0.3 SOIL - 22/3/2022 SE230272.021
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1	<1	<1	<1

SGS

ANALYTICAL RESULTS SE230272 R0

PCBs in Soil [AN420] Tested: 24/3/2022 (continued)

PARAMETER	UOM	LOR	BH16_0.1-0.2 SOIL - 22/3/2022 SE230272.023	BH17_0.2-0.3 SOIL - 22/3/2022 SE230272.024	BH18M_0.1-0.2 SOIL - 22/3/2022 SE230272.026	BH19_0.05-0.1 SOIL - 22/3/2022 SE230272.028	BH20M_0.1-0.2 SOIL - 22/3/2022 SE230272.029
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1	<1	<1	<1

SGS

ANALYTICAL RESULTS SE230272 R0

Total Phenolics in Soil [AN295] Tested: 29/3/2022

PARAMETER	UOM	LOR	BH2M_0.4-0.5 SOIL - 22/3/2022 SE230272.003	BH4_0.7-0.8 SOIL - 22/3/2022 SE230272.005	BH5_0.4-0.5 SOIL - 22/3/2022 SE230272.007	BH8_0.1-0.2 SOIL - 22/3/2022 SE230272.012	BH12_0.1-0.2 SOIL - 22/3/2022 SE230272.017
Total Phenols	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5

PARAMETER	UOM	LOR	BH13_0.2-0.3 SOIL - 22/3/2022 SE230272.018	BH14_0.1-0.2 SOIL - 22/3/2022 SE230272.020	BH15_0.2-0.3 SOIL - 22/3/2022 SE230272.021	BH16_0.1-0.2 SOIL - 22/3/2022 SE230272.023	BH19_0.05-0.1 SOIL - 22/3/2022 SE230272.028
Total Phenols	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5

SGS

ANALYTICAL RESULTS SE230272 R0

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES [AN040/AN320] Tested: 29/3/2022

PARAMETER	UOM	LOR	BH1_0.1-0.2 SOIL - 22/3/2022 SE230272.001	BH1_1.5-1.6 SOIL - 22/3/2022 SE230272.002	BH2M_0.4-0.5 SOIL - 22/3/2022 SE230272.003	BH3_0.2-0.3 SOIL - 22/3/2022 SE230272.004	BH4_0.7-0.8 SOIL - 22/3/2022 SE230272.005
Arsenic, As	mg/kg	1	3	<1	14	4	5
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	0.4	<0.3	<0.3
Chromium, Cr	mg/kg	0.5	13	3.0	14	12	16
Copper, Cu	mg/kg	0.5	2.8	0.6	41	22	35
Lead, Pb	mg/kg	1	18	4	550	190	200
Nickel, Ni	mg/kg	0.5	2.0	<0.5	5.7	8.4	6.1
Zinc, Zn	mg/kg	2	29	<2.0	240	160	360

PARAMETER	UOM	LOR	BH4_1.3-1.4 SOIL - 22/3/2022 SE230272.006	BH5_0.4-0.5 SOIL - 22/3/2022 SE230272.007	BH5_0.9-1.0 SOIL - 22/3/2022 SE230272.008	BH5_1.4-1.5 SOIL - 22/3/2022 SE230272.009	BH6_0.2-0.3 SOIL - 22/3/2022 SE230272.010
Arsenic, As	mg/kg	1	8	2	5	5	4
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.5	16	7.0	15	12	11
Copper, Cu	mg/kg	0.5	<0.5	30	14	<0.5	12
Lead, Pb	mg/kg	1	10	55	88	10	120
Nickel, Ni	mg/kg	0.5	0.8	6.6	4.0	<0.5	4.3
Zinc, Zn	mg/kg	2	19	83	110	8.2	89

PARAMETER	UOM	LOR	BH7_0.5-0.6 SOIL - 22/3/2022 SE230272.011	BH8_0.1-0.2 SOIL - 22/3/2022 SE230272.012	BH9_0.7-0.8 SOIL - 22/3/2022 SE230272.013	BH9_1.4-1.5 SOIL - 22/3/2022 SE230272.014	BH10_0.05-0.1 SOIL - 22/3/2022 SE230272.015
Arsenic, As	mg/kg	1	4	4	3	6	2
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.5	22	13	11	11	100
Copper, Cu	mg/kg	0.5	<0.5	27	39	<0.5	33
Lead, Pb	mg/kg	1	14	150	320	12	9
Nickel, Ni	mg/kg	0.5	<0.5	2.6	7.5	<0.5	81
Zinc, Zn	mg/kg	2	4.7	170	220	2.5	63

PARAMETER	UOM	LOR	BH11_0.05-0.1 SOIL - 22/3/2022 SE230272.016	BH12_0.1-0.2 SOIL - 22/3/2022 SE230272.017	BH13_0.2-0.3 SOIL - 22/3/2022 SE230272.018	BH13_0.6-0.7 SOIL - 22/3/2022 SE230272.019	BH14_0.1-0.2 SOIL - 22/3/2022 SE230272.020
Arsenic, As	mg/kg	1	3	2	3	4	3
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.5	21	7.8	16	15	11
Copper, Cu	mg/kg	0.5	38	6.8	16	<0.5	11
Lead, Pb	mg/kg	1	11	17	67	7	54
Nickel, Ni	mg/kg	0.5	80	2.9	8.8	<0.5	6.2
Zinc, Zn	mg/kg	2	40	11	92	<2.0	55

SGS ANALYTICAL RESULTS SE230272 R0

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES [AN040/AN320] Tested: 29/3/2022

PARAMETER	UOM	LOR	BH15_0.2-0.3 SOIL - 22/3/2022 SE230272.021	BH15_0.7-0.8 SOIL - 22/3/2022 SE230272.022	BH16_0.1-0.2 SOIL - 22/3/2022 SE230272.023	BH17_0.2-0.3 SOIL - 22/3/2022 SE230272.024	BH17_0.7-0.8 SOIL - 22/3/2022 SE230272.025
Arsenic, As	mg/kg	1	2	2	4	5	6
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.5	13	7.5	15	17	15
Copper, Cu	mg/kg	0.5	25	<0.5	16	18	<0.5
Lead, Pb	mg/kg	1	9	6	71	95	14
Nickel, Ni	mg/kg	0.5	26	0.5	6.3	12	<0.5
Zinc, Zn	mg/kg	2	30	<2.0	68	23	9.6

PARAMETER	UOM	LOR	BH18M_0.1-0.2 SOIL - 22/3/2022 SE230272.026	BH18M_1.1-1.2 SOIL - 22/3/2022 SE230272.027	BH19_0.05-0.1 SOIL - 22/3/2022 SE230272.028	BH20M_0.1-0.2 SOIL - 22/3/2022 SE230272.029	BH20M_1.0-1.1 SOIL - 22/3/2022 SE230272.030
Arsenic, As	mg/kg	1	3	4	3	4	7
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.5	16	9.0	13	21	10
Copper, Cu	mg/kg	0.5	3.4	1.0	18	17	<0.5
Lead, Pb	mg/kg	1	30	10	140	160	5
Nickel, Ni	mg/kg	0.5	1.9	0.7	8.9	6.7	<0.5
Zinc, Zn	mg/kg	2	20	6.0	130	86	<2.0

PARAMETER	UOM	LOR	QD1 SOIL - 22/3/2022 SE230272.031
Arsenic, As	mg/kg	1	3
Cadmium, Cd	mg/kg	0.3	<0.3
Chromium, Cr	mg/kg	0.5	17
Copper, Cu	mg/kg	0.5	20
Lead, Pb	mg/kg	1	110
Nickel, Ni	mg/kg	0.5	2.1
Zinc, Zn	mg/kg	2	120

SGS

ANALYTICAL RESULTS SE230272 R0

Mercury in Soil [AN312] Tested: 29/3/2022

PARAMETER	UOM	LOR	BH1_0.1-0.2 SOIL - 22/3/2022 SE230272.001	BH1_1.5-1.6 SOIL - 22/3/2022 SE230272.002	BH2M_0.4-0.5 SOIL - 22/3/2022 SE230272.003	BH3_0.2-0.3 SOIL - 22/3/2022 SE230272.004	BH4_0.7-0.8 SOIL - 22/3/2022 SE230272.005
Mercury	mg/kg	0.05	**0.06**	<0.05	**0.68**	**0.34**	**0.56**

PARAMETER	UOM	LOR	BH4_1.3-1.4 SOIL - 22/3/2022 SE230272.006	BH5_0.4-0.5 SOIL - 22/3/2022 SE230272.007	BH5_0.9-1.0 SOIL - 22/3/2022 SE230272.008	BH5_1.4-1.5 SOIL - 22/3/2022 SE230272.009	BH6_0.2-0.3 SOIL - 22/3/2022 SE230272.010
Mercury	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	**0.50**

PARAMETER	UOM	LOR	BH7_0.5-0.6 SOIL - 22/3/2022 SE230272.011	BH8_0.1-0.2 SOIL - 22/3/2022 SE230272.012	BH9_0.7-0.8 SOIL - 22/3/2022 SE230272.013	BH9_1.4-1.5 SOIL - 22/3/2022 SE230272.014	BH10_0.05-0.1 SOIL - 22/3/2022 SE230272.015
Mercury	mg/kg	0.05	<0.05	**0.23**	**0.47**	<0.05	<0.05

PARAMETER	UOM	LOR	BH11_0.05-0.1 SOIL - 22/3/2022 SE230272.016	BH12_0.1-0.2 SOIL - 22/3/2022 SE230272.017	BH13_0.2-0.3 SOIL - 22/3/2022 SE230272.018	BH13_0.6-0.7 SOIL - 22/3/2022 SE230272.019	BH14_0.1-0.2 SOIL - 22/3/2022 SE230272.020
Mercury	mg/kg	0.05	<0.05	<0.05	**0.06**	<0.05	**0.11**

PARAMETER	UOM	LOR	BH15_0.2-0.3 SOIL - 22/3/2022 SE230272.021	BH15_0.7-0.8 SOIL - 22/3/2022 SE230272.022	BH16_0.1-0.2 SOIL - 22/3/2022 SE230272.023	BH17_0.2-0.3 SOIL - 22/3/2022 SE230272.024	BH17_0.7-0.8 SOIL - 22/3/2022 SE230272.025
Mercury	mg/kg	0.05	<0.05	<0.05	**0.09**	<0.05	<0.05

PARAMETER	UOM	LOR	BH18M_0.1-0.2 SOIL - 22/3/2022 SE230272.026	BH18M_1.1-1.2 SOIL - 22/3/2022 SE230272.027	BH19_0.05-0.1 SOIL - 22/3/2022 SE230272.028	BH20M_0.1-0.2 SOIL - 22/3/2022 SE230272.029	BH20M_1.0-1.1 SOIL - 22/3/2022 SE230272.030
Mercury	mg/kg	0.05	**0.08**	<0.05	**0.12**	<0.05	<0.05

PARAMETER	UOM	LOR	QD1 SOIL - 22/3/2022 SE230272.031
Mercury	mg/kg	0.05	**0.21**

SGS

ANALYTICAL RESULTS SE230272 R0

Moisture Content [AN002] Tested: 25/3/2022

PARAMETER	UOM	LOR	BH1_0.1-0.2 SOIL - 22/3/2022 SE230272.001	BH1_1.5-1.6 SOIL - 22/3/2022 SE230272.002	BH2M_0.4-0.5 SOIL - 22/3/2022 SE230272.003	BH3_0.2-0.3 SOIL - 22/3/2022 SE230272.004	BH4_0.7-0.8 SOIL - 22/3/2022 SE230272.005
% Moisture	%w/w	1	**17.9**	**13.4**	**17.9**	**20.3**	**18.8**

PARAMETER	UOM	LOR	BH4_1.3-1.4 SOIL - 22/3/2022 SE230272.006	BH5_0.4-0.5 SOIL - 22/3/2022 SE230272.007	BH5_0.9-1.0 SOIL - 22/3/2022 SE230272.008	BH5_1.4-1.5 SOIL - 22/3/2022 SE230272.009	BH6_0.2-0.3 SOIL - 22/3/2022 SE230272.010
% Moisture	%w/w	1	**14.2**	**33.2**	**28.2**	**18.4**	**17.4**

PARAMETER	UOM	LOR	BH7_0.5-0.6 SOIL - 22/3/2022 SE230272.011	BH8_0.1-0.2 SOIL - 22/3/2022 SE230272.012	BH9_0.7-0.8 SOIL - 22/3/2022 SE230272.013	BH9_1.4-1.5 SOIL - 22/3/2022 SE230272.014	BH10_0.05-0.1 SOIL - 22/3/2022 SE230272.015
% Moisture	%w/w	1	**15.6**	**15.3**	**17.9**	**17.5**	**6.4**

PARAMETER	UOM	LOR	BH11_0.05-0.1 SOIL - 22/3/2022 SE230272.016	BH12_0.1-0.2 SOIL - 22/3/2022 SE230272.017	BH13_0.2-0.3 SOIL - 22/3/2022 SE230272.018	BH13_0.6-0.7 SOIL - 22/3/2022 SE230272.019	BH14_0.1-0.2 SOIL - 22/3/2022 SE230272.020
% Moisture	%w/w	1	**10.5**	**13.3**	**18.0**	**15.4**	**11.4**

PARAMETER	UOM	LOR	BH15_0.2-0.3 SOIL - 22/3/2022 SE230272.021	BH15_0.7-0.8 SOIL - 22/3/2022 SE230272.022	BH16_0.1-0.2 SOIL - 22/3/2022 SE230272.023	BH17_0.2-0.3 SOIL - 22/3/2022 SE230272.024	BH17_0.7-0.8 SOIL - 22/3/2022 SE230272.025
% Moisture	%w/w	1	**14.5**	**16.2**	**17.3**	**14.5**	**14.6**

PARAMETER	UOM	LOR	BH18M_0.1-0.2 SOIL - 22/3/2022 SE230272.026	BH18M_1.1-1.2 SOIL - 22/3/2022 SE230272.027	BH19_0.05-0.1 SOIL - 22/3/2022 SE230272.028	BH20M_0.1-0.2 SOIL - 22/3/2022 SE230272.029	BH20M_1.0-1.1 SOIL - 22/3/2022 SE230272.030
% Moisture	%w/w	1	**16.7**	**10.2**	**23.4**	**16.6**	**12.6**

PARAMETER	UOM	LOR	QD1 SOIL - 22/3/2022 SE230272.031	QTB SOIL - 22/3/2022 SE230272.033
% Moisture	%w/w	1	**12.7**	<1.0

SGS

ANALYTICAL RESULTS SE230272 R0

Fibre Identification in soil [AN602] Tested: 29/3/2022

PARAMETER	UOM	LOR	BH1_0.1-0.2 SOIL - 22/3/2022 SE230272.001	BH2M_0.4-0.5 SOIL - 22/3/2022 SE230272.003	BH3_0.2-0.3 SOIL - 22/3/2022 SE230272.004	BH4_0.7-0.8 SOIL - 22/3/2022 SE230272.005	BH5_0.4-0.5 SOIL - 22/3/2022 SE230272.007
Asbestos Detected	No unit	-	No	No	No	No	No
Estimated Fibres*	%w/w	0.01	<0.01	<0.01	<0.01	<0.01	<0.01

PARAMETER	UOM	LOR	BH5_0.9-1.0 SOIL - 22/3/2022 SE230272.008	BH6_0.2-0.3 SOIL - 22/3/2022 SE230272.010	BH7_0.5-0.6 SOIL - 22/3/2022 SE230272.011	BH8_0.1-0.2 SOIL - 22/3/2022 SE230272.012	BH9_0.7-0.8 SOIL - 22/3/2022 SE230272.013
Asbestos Detected	No unit	-	No	No	No	No	No
Estimated Fibres*	%w/w	0.01	<0.01	<0.01	<0.01	<0.01	<0.01

PARAMETER	UOM	LOR	BH10_0.05-0.1 SOIL - 22/3/2022 SE230272.015	BH11_0.05-0.1 SOIL - 22/3/2022 SE230272.016	BH12_0.1-0.2 SOIL - 22/3/2022 SE230272.017	BH13_0.2-0.3 SOIL - 22/3/2022 SE230272.018	BH14_0.1-0.2 SOIL - 22/3/2022 SE230272.020
Asbestos Detected	No unit	-	No	No	No	No	No
Estimated Fibres*	%w/w	0.01	<0.01	<0.01	<0.01	<0.01	<0.01

PARAMETER	UOM	LOR	BH15_0.2-0.3 SOIL - 22/3/2022 SE230272.021	BH16_0.1-0.2 SOIL - 22/3/2022 SE230272.023	BH17_0.2-0.3 SOIL - 22/3/2022 SE230272.024	BH18M_0.1-0.2 SOIL - 22/3/2022 SE230272.026	BH19_0.05-0.1 SOIL - 22/3/2022 SE230272.028
Asbestos Detected	No unit	-	No	No	No	No	No
Estimated Fibres*	%w/w	0.01	<0.01	<0.01	<0.01	<0.01	<0.01

PARAMETER	UOM	LOR	BH20M_0.1-0.2 SOIL - 22/3/2022 SE230272.029
Asbestos Detected	No unit	-	No
Estimated Fibres*	%w/w	0.01	<0.01

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ANALYTICAL RESULTS SE230272 R0

VOCs in Water [AN433] Tested: 28/3/2022

PARAMETER	UOM	LOR	QR1 WATER - 22/3/2022 SE230272.032
Benzene	µg/L	0.5	<0.5
Toluene	µg/L	0.5	<0.5
Ethylbenzene	µg/L	0.5	<0.5
m/p-xylene	µg/L	1	<1
o-xylene	µg/L	0.5	<0.5
Total Xylenes	µg/L	1.5	<1.5
Total BTEX	µg/L	3	<3
Naphthalene (VOC)	µg/L	0.5	<0.5

SGS

ANALYTICAL RESULTS SE230272 R0

Volatile Petroleum Hydrocarbons in Water [AN433] Tested: 28/3/2022

PARAMETER	UOM	LOR	QR1 WATER - 22/3/2022 SE230272.032
TRH C6-C9	µg/L	40	<40
Benzene (F0)	µg/L	0.5	<0.5
TRH C6-C10	µg/L	50	<50
TRH C6-C10 minus BTEX (F1)	µg/L	50	<50

SGS

ANALYTICAL RESULTS SE230272 R0

TRH (Total Recoverable Hydrocarbons) in Water [AN403] Tested: 24/3/2022

PARAMETER	UOM	LOR	QR1 WATER - 22/3/2022 SE230272.032
TRH C10-C14	µg/L	50	<50
TRH C15-C28	µg/L	200	<200
TRH C29-C36	µg/L	200	<200
TRH C37-C40	µg/L	200	<200
TRH >C10-C16	µg/L	60	<60
TRH >C10-C16 - Naphthalene (F2)	µg/L	60	<60
TRH >C16-C34 (F3)	µg/L	500	<500
TRH >C34-C40 (F4)	µg/L	500	<500
TRH C10-C40	µg/L	320	<320

SGS ANALYTICAL RESULTS SE230272 R0

Trace Metals (Dissolved) in Water by ICPMS [AN318] Tested: 24/3/2022

PARAMETER	UOM	LOR	QR1 WATER - 22/3/2022 SE230272.032
Arsenic, As	µg/L	1	<1
Cadmium, Cd	µg/L	0.1	<0.1
Chromium, Cr	µg/L	1	<1
Copper, Cu	µg/L	1	<1
Lead, Pb	µg/L	1	<1
Nickel, Ni	µg/L	1	<1
Zinc, Zn	µg/L	5	<5

SGS

ANALYTICAL RESULTS SE230272 R0

Mercury (dissolved) in Water [AN311(Perth)/AN312] Tested: 24/3/2022

PARAMETER	UOM	LOR	QR1 WATER - 22/3/2022 SE230272.032
Mercury	mg/L	0.0001	<0.0001

SGS

METHOD SUMMARY

SE230272 R0

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN020	Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B.
AN040/AN320	A portion of sample is digested with nitric acid to decompose organic matter and hydrochloric acid to complete the digestion of metals. The digest is then analysed by ICP OES with metals results reported on the dried sample basis. Based on USEPA method 200.8 and 6010C.
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analysis by ASS or ICP as per USEPA Method 200.8.
AN295	For Soil, a 1:10 NaOH extraction is made and analysed after 16 hours. The soil extract or water sample is distilled in a phosphoric acid stream. Phenolic compounds in the distillate react with a reagent stream of potassium hexacyanoferrate(III) and 4-Amino-2,3-dimethyl-3-pryazolin-5-one in an alkaline medium to form a coloured complex which is analysed spectrophotometrically onboard a continuous flow analyser.
AN311(Perth)/AN312	Mercury by Cold Vapour AAS in Waters: Mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500.
AN312	Mercury by Cold Vapour AAS in Soils: After digestion with nitric acid, hydrogen peroxide and hydrochloric acid, mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500
AN318	Determination of elements at trace level in waters by ICP-MS technique,, referenced to USEPA 6020B and USEPA 200.8 (5.4).
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). F2 is reported directly and also corrected by subtracting Naphthalene (from VOC method AN433) where available.
AN403	Additionally, the volatile C6-C9 fraction may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Recoverable Hydrocarbons - Silica (TRH-Si) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents.
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN420	SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC's are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.
AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic `clues`, which provide a reasonable degree of certainty, dispersion staining is a mandatory `clue` for positive identification. If sufficient `clues` are absent, then positive identification of asbestos is not possible. This procedure requires removal of suspect fibres/bundles from the sample which cannot be returned.
AN602	Fibres/material that cannot be unequivocably identified as one of the three asbestos forms, will be reported as unknown mineral fibres (umf) The fibres detected may or may not be asbestos fibres.

SGS

METHOD SUMMARY

SE230272 R0

AN602	AS4964.2004 Method for the Qualitative Identification of Asbestos in Bulk Samples, Section 8.4, Trace Analysis Criteria, Note 4 states:"Depending upon sample condition and fibre type, the detection/reporting limit (RL) of this technique has been found to lie generally in the range of 1 in 1,000 to 1 in 10,000 parts by weight, equivalent to 1 to 0.1 g/kg."
AN602	The sample can be reported "no asbestos found at the reporting limit (RL) of 0.1 g/kg" (<0.01%w/w) where AN602 section 4.5 of this method has been followed, and if- (a) no trace asbestos fibres have been detected (i.e. no 'respirable ' fibres): (b) the estimated weight of non-respirable asbestos fibre bundles and/or the estimated weight of asbestos in asbestos-containing materials are found to be less than 0.1g/kg: and (c) these non-respirable asbestos fibre bundles and/or the asbestos containing materials are only visible under stereo-microscope viewing conditions.

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
**	Indicative data, theoretical holding time exceeded.	NVL	Not validated.	LOR	Limit of Reporting.
***	Indicates that both * and ** apply.	IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au/en-gb/environment-health-and-safety .

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ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

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Project	**E25473 9Albert&31O'Connell NthParramatta**
Order Number	**E25473**
Samples	21

LABORATORY DETAILS

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SGS Reference	**SE230272 R0**
Date Received	22 Mar 2022
Date Reported	30 Mar 2022

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

No respirable fibres detected in all soil samples using trace analysis technique.

Asbestos analysed by Approved Identifier Yusuf Kuthpudin.

SIGNATORIES

Yusuf KUTHPUDIN
Asbestos Analyst

SGS

ANALYTICAL REPORT

SE230272 R0

RESULTS

Fibre Identification in soil — Method AN602

Laboratory Reference	Client Reference	Matrix	Sample Description	Date Sampled	Fibre Identification	Est.%w/w*
SE230272.001	BH1_0.1-0.2	Soil	248g Clay,Sand,Rocks	22 Mar 2022	No Asbestos Found at RL of 0.1g/kg	<0.01
SE230272.003	BH2M_0.4-0.5	Soil	226g Clay,Sand,Soil,Rocks	22 Mar 2022	No Asbestos Found at RL of 0.1g/kg	<0.01
SE230272.004	BH3_0.2-0.3	Soil	172g Clay,Sand,Soil,Rocks	22 Mar 2022	No Asbestos Found at RL of 0.1g/kg	<0.01
SE230272.005	BH4_0.7-0.8	Soil	197g Clay,Sand,Soil,Rocks	22 Mar 2022	No Asbestos Found at RL of 0.1g/kg	<0.01
SE230272.007	BH5_0.4-0.5	Soil	184g Clay,Sand,Soil,Rocks	22 Mar 2022	No Asbestos Found at RL of 0.1g/kg	<0.01
SE230272.008	BH5_0.9-1.0	Soil	160g Clay,Sand,Soil,Rocks	22 Mar 2022	No Asbestos Found at RL of 0.1g/kg Organic Fibres Detected	<0.01
SE230272.010	BH6_0.2-0.3	Soil	170g Clay,Sand,Soil,Rocks	22 Mar 2022	No Asbestos Found at RL of 0.1g/kg	<0.01
SE230272.011	BH7_0.5-0.6	Soil	212g Clay,Rocks	22 Mar 2022	No Asbestos Found at RL of 0.1g/kg	<0.01
SE230272.012	BH8_0.1-0.2	Soil	226g Clay,Sand,Soil,Rocks	22 Mar 2022	No Asbestos Found at RL of 0.1g/kg	<0.01
SE230272.013	BH9_0.7-0.8	Soil	168g Sand,Soil,Rocks	22 Mar 2022	No Asbestos Found at RL of 0.1g/kg	<0.01
SE230272.015	BH10_0.05-0.1	Soil	181g Sand,Soil,Rocks	22 Mar 2022	No Asbestos Found at RL of 0.1g/kg	<0.01
SE230272.016	BH11_0.05-0.1	Soil	188g Clay,Sand,Soil,Rocks,Bitumen	22 Mar 2022	No Asbestos Found at RL of 0.1g/kg	<0.01
SE230272.017	BH12_0.1-0.2	Soil	219g Clay,Sand,Soil,Rocks	22 Mar 2022	No Asbestos Found at RL of 0.1g/kg	<0.01
SE230272.018	BH13_0.2-0.3	Soil	184g Clay,Sand,Soil,Rocks	22 Mar 2022	No Asbestos Found at RL of 0.1g/kg Organic Fibres Detected	<0.01
SE230272.020	BH14_0.1-0.2	Soil	181g Clay,Sand,Soil,Rocks	22 Mar 2022	No Asbestos Found at RL of 0.1g/kg	<0.01
SE230272.021	BH15_0.2-0.3	Soil	189g Clay,Sand,Soil,Rocks,Bitumen	22 Mar 2022	No Asbestos Found at RL of 0.1g/kg	<0.01
SE230272.023	BH16_0.1-0.2	Soil	178g Clay,Sand,Soil,Rocks	22 Mar 2022	No Asbestos Found at RL of 0.1g/kg	<0.01
SE230272.024	BH17_0.2-0.3	Soil	187g Clay,Sand,Soil,Rocks,Bitumen	22 Mar 2022	No Asbestos Found at RL of 0.1g/kg	<0.01
SE230272.026	BH18M_0.1-0.2	Soil	146g Clay,Sand,Soil,Rocks	22 Mar 2022	No Asbestos Found at RL of 0.1g/kg	<0.01
SE230272.028	BH19_0.05-0.1	Soil	187g Clay,Sand,Soil,Rocks	22 Mar 2022	No Asbestos Found at RL of 0.1g/kg	<0.01

SGS

ANALYTICAL REPORT

SE230272 R0

RESULTS

Fibre Identification in soil — Method AN602

Laboratory Reference	Client Reference	Matrix	Sample Description	Date Sampled	Fibre Identification	Est.%w/w*
SE230272.029	BH20M_0.1-0.2	Soil	189g Clay,Sand,Soil, Rocks	22 Mar 2022	No Asbestos Found at RL of 0.1g/kg Organic Fibres Detected	<0.01

SGS

METHOD SUMMARY

SE230272 R0

METHOD	METHODOLOGY SUMMARY
AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic `clues`, which provide a reasonable degree of certainty, dispersion staining is a mandatory `clue` for positive identification. If sufficient `clues` are absent, then positive identification of asbestos is not possible. This procedure requires removal of suspect fibres/bundles from the sample which cannot be returned.
AN602	Fibres/material that cannot be unequivocably identified as one of the three asbestos forms, will be reported as unknown mineral fibres (umf) The fibres detected may or may not be asbestos fibres.
AN602	AS4964.2004 Method for the Qualitative Identification of Asbestos in Bulk Samples, Section 8.4, Trace Analysis Criteria, Note 4 states:"Depending upon sample condition and fibre type, the detection/reporting limit (RL) of this technique has been found to lie generally in the range of 1 in 1,000 to 1 in 10,000 parts by weight, equivalent to 1 to 0.1 g/kg."
AN602	The sample can be reported "no asbestos found at the reporting limit (RL) of 0.1 g/kg" (<0.01%w/w) where AN602 section 4.5 of this method has been followed, and if- (a) no trace asbestos fibres have been detected (i.e. no 'respirable ' fibres): (b) the estimated weight of non-respirable asbestos fibre bundles and/or the estimated weight of asbestos in asbestos-containing materials are found to be less than 0.1g/kg: and (c) these non-respirable asbestos fibre bundles and/or the asbestos containing materials are only visible under stereo-microscope viewing conditions.

FOOTNOTES

Amosite	-	Brown Asbestos	NA	-	Not Analysed
Chrysotile	-	White Asbestos	LNR	-	Listed, Not Required
Crocidolite	-	Blue Asbestos	*	-	NATA accreditation does not cover the performance of this service.
Amphiboles	-	Amosite and/or Crocidolite	**	-	Indicative data, theoretical holding time exceeded.
			***	-	Indicates that both * and ** apply.

(In reference to soil samples only) This report does not comply with the analytical reporting recommendations in the Western Australian Department of Health Guidelines for the Assessment and Remediation and Management of Asbestos Contaminated sites in Western Australia - May 2009.

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.

Where reported: 'Asbestos Detected': Asbestos detected by polarised light microscopy, including dispersion staining.
Where reported: 'No Asbestos Found': No Asbestos Found by polarised light microscopy, including dispersion staining.
Where reported: 'UMF Detected': Mineral fibres of unknown type detected by polarised light microscopy, including dispersion staining. Confirmation by another independent analytical technique may be necessary.

Even after disintegration it can be very difficult, or impossible, to detect the presence of asbestos in some asbestos-containing bulk materials using polarised light microscopy. This is due to the low grade or small length or diameter of asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au/en-gb/environment-health-and-safety.

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ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

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Project	**E25473 9Albert&31O'Connell NthParramatta**
Order Number	**E25473**
Samples	34

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SGS Reference	**SE230272A R0**
Date Received	30/3/2022
Date Reported	6/4/2022

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

SIGNATORIES

Bennet LO
Senior Chemist

Shane MCDERMOTT
Inorganic/Metals Chemist

Teresa NGUYEN
Organic Chemist

SGS ANALYTICAL RESULTS SE230272A R0

TCLP (Toxicity Characteristic Leaching Procedure) for Organics/SVOC [AN006] Tested: 1/4/2022

PARAMETER	UOM	LOR	BH2M_0.4-0.5 SOIL - 22/3/2022 SE230272A.003	BH4_0.7-0.8 SOIL - 22/3/2022 SE230272A.005	BH6_0.2-0.3 SOIL - 22/3/2022 SE230272A.010	BH9_0.7-0.8 SOIL - 22/3/2022 SE230272A.013
pH 1:20	pH Units	-	**6.4**	**7.3**	**6.8**	**6.8**
pH 1:20 plus HCL	pH Units	-	**2.0**	**2.1**	**2.1**	**2.1**
Extraction Solution Used	No unit	-	**1**	**1**	**1**	**1**
Mass of Sample Used*	g	-	**25**	**25**	**25**	**25**
Volume of ExtractionSolution Used*	mL	-	**500**	**500**	**500**	**500**
pH TCLP after 18 hours	pH Units	-	**4.8**	**4.9**	**4.9**	**4.9**

SGS

ANALYTICAL RESULTS SE230272A R0

PAH (Polynuclear Aromatic Hydrocarbons) in TCLP Extract [AN420] Tested: 4/4/2022

PARAMETER	UOM	LOR	BH2M_0.4-0.5 SOIL - 22/3/2022 SE230272A.003	BH4_0.7-0.8 SOIL - 22/3/2022 SE230272A.005	BH6_0.2-0.3 SOIL - 22/3/2022 SE230272A.010	BH9_0.7-0.8 SOIL - 22/3/2022 SE230272A.013
Benzo(a)pyrene	µg/L	0.1	<0.1	<0.1	<0.1	**0.3**

SGS

ANALYTICAL RESULTS SE230272A R0

TCLP (Toxicity Characteristic Leaching Procedure) for Metals [AN006] Tested: 1/4/2022

PARAMETER	UOM	LOR	BH8_0.1-0.2 SOIL - 22/3/2022 SE230272A.012	BH10_0.05-0.1 SOIL - 22/3/2022 SE230272A.015
pH 1:20	pH Units	-	**7.1**	**8.7**
pH 1:20 plus HCL	pH Units	-	**2.0**	**1.9**
Extraction Solution Used	No unit	-	**1**	**1**
Mass of Sample Used*	g	-	**13**	**13**
Volume of ExtractionSolution Used*	mL	-	**250**	**250**
pH TCLP after 18 hours	pH Units	-	**4.9**	**5.5**

SGS

ANALYTICAL RESULTS SE230272A R0

Metals in TCLP Extract by ICPOES [AN320] Tested: 6/4/2022

PARAMETER	UOM	LOR	BH2M_0.4-0.5 SOIL - 22/3/2022 SE230272A.003	BH4_0.7-0.8 SOIL - 22/3/2022 SE230272A.005	BH8_0.1-0.2 SOIL - 22/3/2022 SE230272A.012	BH9_0.7-0.8 SOIL - 22/3/2022 SE230272A.013	BH10_0.05-0.1 SOIL - 22/3/2022 SE230272A.015
Lead, Pb	mg/L	0.02	**0.30**	**0.06**	**0.06**	**0.21**	-
Chromium, Cr	mg/L	0.005	-	-	-	-	<0.005
Nickel, Ni	mg/L	0.005	-	-	-	-	**0.029**

SGS

METHOD SUMMARY

SE230272A R0

METHOD	METHODOLOGY SUMMARY
AN006	Contaminants of interest in a waste material are leached out of the waste with a selected leaching solution under controlled conditions. The ratio of sample to extraction fluid is 100g to 2L (1 to 20 by mass). The concentration of each contaminant of interest is determined in the leachate by appropriate methods after separation from the sample by filtering. Base on USEPA 1311.
AN006	Extraction Fluid #1: This fluid is made by combining 128.6mL of dilute sodium hydroxide solution and 11.5mL glacial acetic acid with water and diluting to a volume of 2 litres. The pH of this fluid should be 4.93 ± 0.05.
AN006	Extraction Fluid #2: This fluid is made by diluting 5.7mL glacial acetic acid with water to a volume of 1 litre. The pH of this fluid should be 2.88 ± 0.05.
AN020	Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B.
AN320	Metals by ICP-OES: Samples are preserved with 10% nitric acid for a wide range of metals and some non-metals. This solution is measured by Inductively Coupled Plasma. Solutions are aspirated into an argon plasma at 8000-10000K and emit characteristic energy or light as a result of electron transitions through unique energy levels. The emitted light is focused onto a diffraction grating where it is separated into components .
AN320	Photomultipliers or CCDs are used to measure the light intensity at specific wavelengths. This intensity is directly proportional to concentration. Corrections are required to compensate for spectral overlap between elements . Reference APHA 3120 B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).

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FOOTNOTES

SE230272A R0

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
**	Indicative data, theoretical holding time exceeded.	NVL	Not validated.	LOR	Limit of Reporting.
***	Indicates that both * and ** apply.	IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au/en-gb/environment-health-and-safety .

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ANALYTICAL REPORT

Accreditation No. 2562

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Order Number	**E25473**
Samples	7

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SGS Reference	**SE230450 R0**
Date Received	29/3/2022
Date Reported	7/4/2022

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

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ANALYTICAL RESULTS

SE230450 R0

VOCs in Water [AN433] Tested: 4/4/2022

PARAMETER	UOM	LOR	GW-BH2M-1 WATER - 29/3/2022 SE230450.001	GW-BH18M-1 WATER - 29/3/2022 SE230450.002	GW-BH20M-1 WATER - 29/3/2022 SE230450.003	QD1 WATER - 29/3/2022 SE230450.004	QR1 WATER - 29/3/2022 SE230450.005
Benzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
m/p-xylene	µg/L	1	<1	<1	<1	<1	<1
o-xylene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Xylenes	µg/L	1.5	<1.5	<1.5	<1.5	<1.5	<1.5
Total BTEX	µg/L	3	<3	<3	<3	<3	<3
Naphthalene (VOC)	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichlorodifluoromethane (CFC-12)	µg/L	5	<5	<5	<5	-	-
Chloromethane	µg/L	5	<5	<5	<5	-	-
Vinyl chloride (Chloroethene)	µg/L	0.3	<0.3	<0.3	<0.3	-	-
Bromomethane	µg/L	10	<10	<10	<10	-	-
Chloroethane	µg/L	5	<5	<5	<5	-	-
Trichlorofluoromethane	µg/L	1	<1	<1	<1	-	-
Acetone (2-propanone)	µg/L	10	<10	<10	<10	-	-
Iodomethane	µg/L	5	<5	<5	<5	-	-
1,1-dichloroethene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
Acrylonitrile	µg/L	0.5	<0.5	<0.5	<0.5	-	-
Dichloromethane (Methylene chloride)	µg/L	5	<5	<5	<5	-	-
Allyl chloride	µg/L	2	<2	<2	<2	-	-
Carbon disulfide	µg/L	2	<2	<2	<2	-	-
trans-1,2-dichloroethene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
MtBE (Methyl-tert-butyl ether)	µg/L	2	<2	<2	<2	-	-
1,1-dichloroethane	µg/L	0.5	<0.5	<0.5	<0.5	-	-
Vinyl acetate	µg/L	10	<10	<10	<10	-	-
MEK (2-butanone)	µg/L	10	<10	<10	<10	-	-
cis-1,2-dichloroethene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
Bromochloromethane	µg/L	0.5	<0.5	<0.5	<0.5	-	-
Chloroform (THM)	µg/L	0.5	<0.5	**0.6**	<0.5	-	-
2,2-dichloropropane	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,2-dichloroethane	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,1,1-trichloroethane	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,1-dichloropropene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
Carbon tetrachloride	µg/L	0.5	<0.5	<0.5	<0.5	-	-
Dibromomethane	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,2-dichloropropane	µg/L	0.5	<0.5	<0.5	<0.5	-	-
Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	<0.5	<0.5	<0.5	-	-
2-nitropropane	µg/L	100	<100	<100	<100	-	-
Bromodichloromethane (THM)	µg/L	0.5	<0.5	<0.5	<0.5	-	-
MIBK (4-methyl-2-pentanone)	µg/L	5	<5	<5	<5	-	-
cis-1,3-dichloropropene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
trans-1,3-dichloropropene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,1,2-trichloroethane	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,3-dichloropropane	µg/L	0.5	<0.5	<0.5	<0.5	-	-
Dibromochloromethane (THM)	µg/L	0.5	<0.5	<0.5	<0.5	-	-
2-hexanone (MBK)	µg/L	5	<5	<5	<5	-	-
1,2-dibromoethane (EDB)	µg/L	0.5	<0.5	<0.5	<0.5	-	-
Tetrachloroethene (Perchloroethylene,PCE)	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,1,1,2-tetrachloroethane	µg/L	0.5	<0.5	<0.5	<0.5	-	-
Chlorobenzene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
Bromoform (THM)	µg/L	0.5	<0.5	<0.5	<0.5	-	-
cis-1,4-dichloro-2-butene	µg/L	1	<1	<1	<1	-	-
Styrene (Vinyl benzene)	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,1,2,2-tetrachloroethane	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,2,3-trichloropropane	µg/L	0.5	<0.5	<0.5	<0.5	-	-
trans-1,4-dichloro-2-butene	µg/L	1	<1	<1	<1	-	-

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ANALYTICAL RESULTS SE230450 R0

VOCs in Water [AN433] Tested: 4/4/2022 (continued)

PARAMETER	UOM	LOR	GW-BH2M-1 WATER - 29/3/2022 SE230450.001	GW-BH18M-1 WATER - 29/3/2022 SE230450.002	GW-BH20M-1 WATER - 29/3/2022 SE230450.003	QD1 WATER - 29/3/2022 SE230450.004	QR1 WATER - 29/3/2022 SE230450.005
Isopropylbenzene (Cumene)	µg/L	0.5	<0.5	<0.5	<0.5	-	-
Bromobenzene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
n-propylbenzene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
2-chlorotoluene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
4-chlorotoluene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,3,5-trimethylbenzene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
tert-butylbenzene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,2,4-trimethylbenzene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
sec-butylbenzene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,3-dichlorobenzene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,4-dichlorobenzene	µg/L	0.3	<0.3	<0.3	<0.3	-	-
p-isopropyltoluene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,2-dichlorobenzene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
n-butylbenzene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,2-dibromo-3-chloropropane	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,2,4-trichlorobenzene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
Hexachlorobutadiene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,2,3-trichlorobenzene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
Total VOC	µg/L	10	<10	<10	<10	-	-

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ANALYTICAL RESULTS SE230450 R0

VOCs in Water [AN433] Tested: 4/4/2022 (continued)

PARAMETER	UOM	LOR	QTB1 WATER - 29/3/2022 SE230450.006	QTS1 WATER - 29/3/2022 SE230450.007
Benzene	µg/L	0.5	<0.5	[100%]
Toluene	µg/L	0.5	<0.5	[99%]
Ethylbenzene	µg/L	0.5	<0.5	[99%]
m/p-xylene	µg/L	1	<1	[100%]
o-xylene	µg/L	0.5	<0.5	[98%]
Total Xylenes	µg/L	1.5	<1.5	-
Total BTEX	µg/L	3	<3	-
Naphthalene (VOC)	µg/L	0.5	<0.5	[97%]
Dichlorodifluoromethane (CFC-12)	µg/L	5	-	-
Chloromethane	µg/L	5	-	-
Vinyl chloride (Chloroethene)	µg/L	0.3	-	-
Bromomethane	µg/L	10	-	-
Chloroethane	µg/L	5	-	-
Trichlorofluoromethane	µg/L	1	-	-
Acetone (2-propanone)	µg/L	10	-	-
Iodomethane	µg/L	5	-	-
1,1-dichloroethene	µg/L	0.5	-	-
Acrylonitrile	µg/L	0.5	-	-
Dichloromethane (Methylene chloride)	µg/L	5	-	-
Allyl chloride	µg/L	2	-	-
Carbon disulfide	µg/L	2	-	-
trans-1,2-dichloroethene	µg/L	0.5	-	-
MtBE (Methyl-tert-butyl ether)	µg/L	2	-	-
1,1-dichloroethane	µg/L	0.5	-	-
Vinyl acetate	µg/L	10	-	-
MEK (2-butanone)	µg/L	10	-	-
cis-1,2-dichloroethene	µg/L	0.5	-	-
Bromochloromethane	µg/L	0.5	-	-
Chloroform (THM)	µg/L	0.5	-	-
2,2-dichloropropane	µg/L	0.5	-	-
1,2-dichloroethane	µg/L	0.5	-	-
1,1,1-trichloroethane	µg/L	0.5	-	-
1,1-dichloropropene	µg/L	0.5	-	-
Carbon tetrachloride	µg/L	0.5	-	-
Dibromomethane	µg/L	0.5	-	-
1,2-dichloropropane	µg/L	0.5	-	-
Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	-	-
2-nitropropane	µg/L	100	-	-
Bromodichloromethane (THM)	µg/L	0.5	-	-
MIBK (4-methyl-2-pentanone)	µg/L	5	-	-
cis-1,3-dichloropropene	µg/L	0.5	-	-
trans-1,3-dichloropropene	µg/L	0.5	-	-
1,1,2-trichloroethane	µg/L	0.5	-	-
1,3-dichloropropane	µg/L	0.5	-	-
Dibromochloromethane (THM)	µg/L	0.5	-	-
2-hexanone (MBK)	µg/L	5	-	-
1,2-dibromoethane (EDB)	µg/L	0.5	-	-
Tetrachloroethene (Perchloroethylene,PCE)	µg/L	0.5	-	-
1,1,1,2-tetrachloroethane	µg/L	0.5	-	-
Chlorobenzene	µg/L	0.5	-	-
Bromoform (THM)	µg/L	0.5	-	-
cis-1,4-dichloro-2-butene	µg/L	1	-	-
Styrene (Vinyl benzene)	µg/L	0.5	-	-
1,1,2,2-tetrachloroethane	µg/L	0.5	-	-
1,2,3-trichloropropane	µg/L	0.5	-	-
trans-1,4-dichloro-2-butene	µg/L	1	-	-

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ANALYTICAL RESULTS SE230450 R0

VOCs in Water [AN433] Tested: 4/4/2022 (continued)

PARAMETER	UOM	LOR	QTB1 WATER - 29/3/2022 SE230450.006	QTS1 WATER - 29/3/2022 SE230450.007
Isopropylbenzene (Cumene)	µg/L	0.5	-	-
Bromobenzene	µg/L	0.5	-	-
n-propylbenzene	µg/L	0.5	-	-
2-chlorotoluene	µg/L	0.5	-	-
4-chlorotoluene	µg/L	0.5	-	-
1,3,5-trimethylbenzene	µg/L	0.5	-	-
tert-butylbenzene	µg/L	0.5	-	-
1,2,4-trimethylbenzene	µg/L	0.5	-	-
sec-butylbenzene	µg/L	0.5	-	-
1,3-dichlorobenzene	µg/L	0.5	-	-
1,4-dichlorobenzene	µg/L	0.3	-	-
p-isopropyltoluene	µg/L	0.5	-	-
1,2-dichlorobenzene	µg/L	0.5	-	-
n-butylbenzene	µg/L	0.5	-	-
1,2-dibromo-3-chloropropane	µg/L	0.5	-	-
1,2,4-trichlorobenzene	µg/L	0.5	-	-
Hexachlorobutadiene	µg/L	0.5	-	-
1,2,3-trichlorobenzene	µg/L	0.5	-	-
Total VOC	µg/L	10	-	-

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ANALYTICAL RESULTS SE230450 R0

Volatile Petroleum Hydrocarbons in Water [AN433] Tested: 4/4/2022

PARAMETER	UOM	LOR	GW-BH2M-1 WATER - 29/3/2022 SE230450.001	GW-BH18M-1 WATER - 29/3/2022 SE230450.002	GW-BH20M-1 WATER - 29/3/2022 SE230450.003	QD1 WATER - 29/3/2022 SE230450.004	QR1 WATER - 29/3/2022 SE230450.005
TRH C6-C9	µg/L	40	<40	<40	<40	<40	<40
Benzene (F0)	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TRH C6-C10	µg/L	50	<50	<50	<50	<50	<50
TRH C6-C10 minus BTEX (F1)	µg/L	50	<50	<50	<50	<50	<50

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ANALYTICAL RESULTS SE230450 R0

TRH (Total Recoverable Hydrocarbons) in Water [AN403] Tested: 1/4/2022

PARAMETER	UOM	LOR	GW-BH2M-1 WATER - 29/3/2022 SE230450.001	GW-BH18M-1 WATER - 29/3/2022 SE230450.002	GW-BH20M-1 WATER - 29/3/2022 SE230450.003	QD1 WATER - 29/3/2022 SE230450.004	QR1 WATER - 29/3/2022 SE230450.005
TRH C10-C14	µg/L	50	**52**	<50	<50	**58**	<50
TRH C15-C28	µg/L	200	<200	<200	<200	<200	<200
TRH C29-C36	µg/L	200	<200	<200	<200	<200	<200
TRH C37-C40	µg/L	200	<200	<200	<200	<200	<200
TRH >C10-C16	µg/L	60	**84**	<60	<60	**93**	<60
TRH >C10-C16 - Naphthalene (F2)	µg/L	60	**84**	<60	<60	**93**	<60
TRH >C16-C34 (F3)	µg/L	500	<500	<500	<500	<500	<500
TRH >C34-C40 (F4)	µg/L	500	<500	<500	<500	<500	<500
TRH C10-C40	µg/L	320	<320	<320	<320	<320	<320

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ANALYTICAL RESULTS SE230450 R0

PAH (Polynuclear Aromatic Hydrocarbons) in Water [AN420] Tested: 1/4/2022

PARAMETER	UOM	LOR	GW-BH2M-1 WATER - 29/3/2022 SE230450.001	GW-BH18M-1 WATER - 29/3/2022 SE230450.002	GW-BH20M-1 WATER - 29/3/2022 SE230450.003
Naphthalene	µg/L	0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	µg/L	0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	µg/L	0.1	<0.1	<0.1	<0.1
Acenaphthylene	µg/L	0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	µg/L	0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	µg/L	0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	µg/L	0.1	<0.1	<0.1	<0.1
Total PAH (18)	µg/L	1	<1	<1	<1

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ANALYTICAL RESULTS

SE230450 R0

Total Phenolics in Water [AN295] **Tested: 30/3/2022**

PARAMETER	UOM	LOR	GW-BH2M-1 WATER - 29/3/2022 SE230450.001	GW-BH18M-1 WATER - 29/3/2022 SE230450.002	GW-BH20M-1 WATER - 29/3/2022 SE230450.003
Total Phenols	mg/L	0.05	<0.05	<0.05	<0.05

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ANALYTICAL RESULTS SE230450 R0

pH in water [AN101] Tested: 29/3/2022

PARAMETER	UOM	LOR	GW-BH2M-1 WATER - 29/3/2022 SE230450.001	GW-BH18M-1 WATER - 29/3/2022 SE230450.002	GW-BH20M-1 WATER - 29/3/2022 SE230450.003
pH**	No unit	-	**6.7**	**5.0**	**5.4**

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ANALYTICAL RESULTS SE230450 R0

Trace Metals (Dissolved) in Water by ICPMS [AN318] Tested: 30/3/2022

PARAMETER	UOM	LOR	GW-BH2M-1 WATER - 29/3/2022 SE230450.001	GW-BH18M-1 WATER - 29/3/2022 SE230450.002	GW-BH20M-1 WATER - 29/3/2022 SE230450.003	QD1 WATER - 29/3/2022 SE230450.004	QR1 WATER - 29/3/2022 SE230450.005
Arsenic, As	µg/L	1	**1**	<1	<1	**1**	<1
Cadmium, Cd	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium, Cr	µg/L	1	<1	<1	<1	<1	<1
Copper, Cu	µg/L	1	<1	**2**	**3**	**1**	<1
Lead, Pb	µg/L	1	<1	<1	<1	<1	<1
Nickel, Ni	µg/L	1	**1**	**1**	**6**	**1**	<1
Zinc, Zn	µg/L	5	**24**	**22**	**57**	**20**	<5

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ANALYTICAL RESULTS SE230450 R0

Mercury (dissolved) in Water [AN311(Perth)/AN312] Tested: 30/3/2022

PARAMETER	UOM	LOR	GW-BH2M-1 WATER - 29/3/2022 SE230450.001	GW-BH18M-1 WATER - 29/3/2022 SE230450.002	GW-BH20M-1 WATER - 29/3/2022 SE230450.003	QD1 WATER - 29/3/2022 SE230450.004	QR1 WATER - 29/3/2022 SE230450.005
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

SGS

METHOD SUMMARY

SE230450 R0

METHOD	METHODOLOGY SUMMARY
AN020	Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B.
AN101	pH in Soil Sludge Sediment and Water: pH is measured electrometrically using a combination electrode (glass plus reference electrode) and is calibrated against 3 buffers purchased commercially. For soils, an extract with water is made at a ratio of 1:5 and the pH determined and reported on the extract. Reference APHA 4500-H+.
AN295	The water sample or extract of sample is distilled in a phosphoric acid stream. Phenolic compounds in the distillate react with a reagent stream of potassium hexacyanoferrate(III) and 4-Amino-2,3-dimethyl-3-pryazolin-5-one in an alkaline medium to form a coloured complex which is analysed spectrophotometrically onboard a continuous flow analyser.
AN311(Perth)/AN312	Mercury by Cold Vapour AAS in Waters: Mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500.
AN318	Determination of elements at trace level in waters by ICP-MS technique,, referenced to USEPA 6020B and USEPA 200.8 (5.4).
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). Where F2 is corrected for Naphthalene, the VOC data for Naphthalene is used.
AN403	Additionally, the volatile C6-C9/C6-C10 fractions may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Recoveerable Hydrocarbons - Silica (TRH-Silica) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents.
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC's are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.

SGS

FOOTNOTES SE230450 R0

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
**	Indicative data, theoretical holding time exceeded.	NVL	Not validated.	LOR	Limit of Reporting.
***	Indicates that both * and ** apply.	IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au/en-gb/environment-health-and-safety .

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Appendix L – QA/QC Assessment

L1 QUALITY CONTROL PROGRAM

L1.1 PROJECT QA/QC PROTOCOLS

The quality assurance comprises an assessment of the reliability of the field procedures and the laboratory results against standard industry practices, documented sampling and analysis plans or remediation action plans. A summary of the project QA/QC protocols followed during the investigation works is presented in **Table L-1**.

Table L-1 QA/QC Protocols

Task	Description	Project
Field QA/QC		
General	Work was undertaken following standard field procedures which are based on industry accepted standard practice.	Soil samples were generally collected directly off drilling rods or hand auger or hand trowel. Soil samples were placed in 250 gram glass jars, which were filled to minimise headspace, and sealed using Teflon-coated lids. Samples for PFAS analysis were placed in non-Teflon containers
	All fieldwork was supervised by a suitably qualified and experienced scientist or engineer.	Yes
Soil screening with PID	The PID was serviced and calibrated as per the manufacturer requirements. PID calibrated at the beginning and end of each day of fieldwork.	A PID was not used during sampling. No visual or olfactory signs of VOCs; therefore, EI do not consider this to be an investigation constraint.
Rinsate Samples	One rinsate blank would be collected per sampling event and analysed for the primary contaminants. All results should be non-detect.	The results for rinsate samples were reported below laboratory detection o in the rinsate and blank samples for soil and groundwater sampling events.
Transport	Samples were stored in ice-brick cooled cooler box and transported to the primary and secondary laboratories. To ensure the integrity of the samples from collection to receipt by the analytical laboratory, samples were sent by courier to the laboratories under 'chain of custody' describing sample preservation, and transport duration.	Yes
Trip Blanks	Trip blank samples were prepared and analysed by the primary laboratory for BTEX and naphthalene. Analytical results for trip blank samples below the laboratory PQLs, indicate that ideal sample transport and handling conditions are achieved.	Yes

Task	Description	Project
Trip Spikes	Trip spike samples were prepared and analysed by the primary laboratory for BTEX. Acceptance criteria of BTEX spike recoveries are between 70% - 130%.	Yes
QA samples	Field and laboratory QA samples will be analysed as follows: Intra-laboratory and inter-laboratory duplicate samples will be collected at a rate of 1 pair per 20 primary samples	Yes See **Table L-2** Calculated RPD (**Table 4**) values between primary and field duplicate samples are within the acceptance criteria (**Section L1.2**) with the exception of the following: **Soil - Blind Field Duplicate (BFD):** All RPD values were within an acceptable range. **Soil - Blind Field Triplicate (BFD):** - Arsenic: 54.55% - Chromium: 93.88% - Lead: 79.09% - Zinc: 110.50% Analytical results for both the Primary and BFD were less than ten times the laboratory PQL, therefore any RPD is acceptable. **Groundwater - Blind Field Duplicate (BFD):** All RPD values were within an acceptable range. **Groundwater - Blind Field Duplicate (BFT):** - Zinc: 62.86% - TRH-F3: 50.75% Analytical results for both the Primary and BFD were less than ten times the laboratory PQL, therefore any RPD is acceptable.
Laboratory QA/QC		
Laboratory analysis	The laboratories selected are NATA accredited for the analytes selected and perform their own internal QA/QC programs	Yes SGS - primary laboratory Envirolab - secondary laboratory The laboratory QA/QC reports are included in **Appendix L.**
	Appropriate detection limits were used for the analyses to be undertaken.	Practical Quantitation Limits for all tested parameters during the assessment of soils, soil vapour and groundwater are presented in summary tables **Table 1 – 2**
	Methods followed are generally in accordance with the requirements of NEPM (2013).	Yes

Task	Description	Project
Holding Times	Holding times are the maximum permissible elapsed time in days from the collection of the sample to its extraction and/or analysis. All extraction and analyses should be completed within standard guidelines.	Yes EI note the analysis date for TCLP of four samples was outside of the suggested time criteria: - BH2M_0.4-0.5 - BH4_0.7-0.8 - BH6_0.2-0.3 - BH9_0.7-0.8
Laboratory Duplicates	Laboratory duplicates are field samples that are split in the laboratory and subsequently analysed a number of times in the same batch. These sub-samples are selected by the laboratory to assess the accuracy and precision of the analytical method. The selected laboratories should undertake QA/QC procedures such as calibration standards, laboratory control samples, surrogates, reference materials, sample duplicates and matrix spikes. Intra-laboratory duplicates should be performed at a frequency of 1 per 10 samples.	The Laboratory duplicate samples for the analysis batches showed calculated RPDs were generally within acceptable ranges except for 18 items which railed RPD acceptance and recovery for PAHs due to heterogeneity. Results were within than 5 times LOR and RPD s acceptable: - LB245228.014 - LB245269.014 - LB245487.014
Laboratory Control Standard	A laboratory control standard is a standard reference material used in preparing primary standards. The concentration should be equivalent to a mid-range standard to confirm the primary calibration. Laboratory control samples should be performed on a frequency of 1 per 20 samples or at least one per analytical run.	The Laboratory Control Samples for the analysis batches were within acceptable ranges.
Matrix Spikes / Matrix Spike Duplicates (MS/MSD)	MS/MSDs are field samples to which a predetermined stock solution of known concentration has been added. The samples are then analysed for recovery of the known addition. Recoveries should be within the stated laboratory control limits of 70 to 130% and duplicates should have RPDs of less than 50%.	Most MS / MSD for the analysis batches were within acceptable ranges. The following laboratory duplicate exceeded acceptance criteria due to matrix interference: - LB245486.004
Surrogate Spikes	Surrogate spikes provide a means of checking, for every analysis that no gross errors have occurred at any stage of the procedure leading to significant analyte loss. Recoveries should be within the stated laboratory control limits of 70 to 130%.	Surrogate spikes for the analysis batches were within acceptable ranges.

Task	Description	Project
QA/QC Conclusion	The QA/QC indicators should either all comply with the required standards or showed no variations that would have no significant effect on the quality of the data.	EI considers that the data confirms that the analytical results for the various phases of laboratory testing were valid and useable for interpretation purposes.

L1.2 Calculation of Relative Percentage Difference (RPD)

The RPD values were calculated using the following equation:

$$RPD = \frac{|C_O - C_R|}{[(C_O + C_R)/2]} \times 100$$

Where:

C_O = Concentration obtained for the primary sample; and

C_R = Concentration obtained for the blind replicate or split duplicate sample.

Data precision would be deemed acceptable if RPDs are found to be less than 30%. RPDs that exceed this range may be considered acceptable where:

- Results are less than 10 times the limits of reporting (LOR);
- Results are less than 20 times the LOR and the RPD is less than 50%; or
- Heterogeneous materials or volatile compounds are encountered.

In cases where RPD value was considered unacceptable, the analytical results of primary and duplicate samples were both reviewed against the adopted assessment criteria. If the review indicates the variations in data between the primary and duplicate samples would result in a different conclusion (e.g. the higher concentration is failing the assessment criteria), the need for re-sampling / validation would be considered.

L2 FIELD QA/QC DATA PROGRAM

L2.1 Field QA Sampling Program

The field quality assurance/quality control (QA/QC) samples collected during the investigation works are summarised on **Table L-2.** Inter-lab duplicates were analysed by the secondary laboratory, Envirolab. Analytical results of the Field QA samples are tabulated in **Table 4**, alongside calculated RPDs between the primary and field duplicate samples.

Table L-2 Field QA Sampling Program

Activity	Matrix	No. Primary Samples	Primary Sample ID	Intra-Lab Duplicate ID	Inter-Lab Duplicate ID	No. of Duplicates	Duplicate Ratio
Field QA Samples - Duplicates							
Soil Investigation	Soil	30	BH8_0.1-0.2	QD1	QT1	2	1:30
GME	Water	3	GW-BH2M-1	QD1	QT1	2	1:3
Other Field QA Samples							
Soil Investigation	Soil	QTB – trip blank QTS – trip spike					
	Water	QR1 – rinsate					
GME	Water	QTB1 – trip blank QTS1 – trip spike QR1 – rinsate					

L2.2 Field Data Quality Indicators

A discussion of the field data quality indicators is presented below.

Table L-4 Field Data Quality Indicators

QA/QC Measures	Field Data Quality Indicators	Conformance / Comments
Precision – A quantitative measure of the variability (or reproducibility) of data	Standard operation procedures appropriate and complied with	Yes
Completeness – A measure of the amount of useable data from a data collection activity	Each critical location sampled	Yes
	Samples collected at targeted locations and depth	Yes
	SAQP appropriate and complied with	Yes
	Experienced sampler	Yes
	Field documentation correct	Yes

QA/QC Measures	Field Data Quality Indicators	Conformance / Comments
Comparability – The confidence (expressed qualitatively) that data may be considered to be equivalent for each sampling and analytical event	Same sampling method used on each occasion/location	Yes
	Experienced sampler	Yes
	Climatic conditions (temperature, rainfall, wind)	Climate conditions were recorded to be fine. These climatic conditions unlikely had significant influence on the results of the investigation.
	Same type of samples collected (filtered, size, fractions)	Yes
Representativeness – The confidence (expressed qualitatively) that data are representative of each medium present onsite	Appropriate media sampled according to SAQP	Yes
	Each media identified in SAQP sampled	Yes
	Appropriate sample collection methodologies, handling, storage and preservation techniques used	Yes
	Consistency between field observations and laboratory results.	Yes
Accuracy – A quantitative measure of the closeness of reported data to the "true" value	Standard operation procedures appropriate and complied with	Yes
	Calibration of instruments against known standards	Yes

L2.3 Conclusion For The Field QA/QC

Based on the above review of the field QA/QC data EI considered the field QA/QC programme carried out during the investigations to be appropriate and the results to be acceptable.

L3 LABORATORY QA/QC

L3.1 LABORATORY ACCREDITATION

Primary and intra-laboratory duplicate samples were analysed by SGS Alexandria Environmental, NSW; inter-laboratory triplicate samples were analysed by Envirolab, Chatswood NSW; all laboratories are accredited by NATA for the analyses undertaken.

A discussion of the laboratory DQIs is presented below.

Table I-5 Lab Data Quality Indicators

QA/QC Measures	Laboratory Data Quality Indicators	Conformance/Comments
Completeness – A measure of the amount of useable data from a data collection activity	All critical samples analysed according to SAQP and proposal	Yes
	All analytes analysed according to SAQP in proposal	Yes
	Appropriate methods and PQLs	Yes
	Sample documentation complete	Yes
	Sample holding times complied with	Yes
Comparability – The confidence (expressed qualitatively) that data may be considered to be equivalent for each sampling and analytical event	Same sample analytical methods used (including clean-up)	Yes
	Same Sample PQLs	Yes
	Same laboratories (NATA-accredited)	Yes
	Same units	Yes
Representativeness – The confidence (expressed qualitatively) that data are representative of each medium present onsite	All key samples analysed according to SAQP in the proposal.	Yes
	Analysis of laboratory-prepared volatile trip spikes and trip blanks	Yes
Precision – A quantitative measure of the variability (or reproducibility) of data	Analysis of laboratory and inter-laboratory duplicates	Yes
	Analysis of field duplicates	Yes
Accuracy – A quantitative measure of the closeness of reported data to the "true" value	Analysis of rinsate blanks	Yes
	Analysis of reagent blanks	Yes
	Analysis of method blanks	Yes
	Analysis of matrix spikes (MS)	Yes
	Analysis of matrix spike duplicates (MSD)	Yes

QA/QC Measures	Laboratory Data Quality Indicators	Conformance/Comments
	Analysis of surrogate spikes	Yes
	Analysis of reference materials	Yes
	Analysis of laboratory control samples	Yes
	Analysis of laboratory-prepared spikes	Yes

Overall, it is considered that the laboratory data quality objectives for this project have been attained.

I3.2 CONCLUSIONS ON LAB QA/QC

Based on the laboratory QA/QC results EI considers that the data generally confirms that the analytical results for the various phases of laboratory testing were valid and useable for interpretation purposes.

I4 SUMMARY OF PROJECT QA/QC

The sampling methods (including sample preservation, transport and decontamination procedures) and laboratory methods followed during this investigation works were consistent with EI protocols and met the DQOs for the project. Some discrepancies from the DQOs were reported however they were considered to not be detrimental to the validity of collected data. It is therefore considered that the data is sufficiently precise and accurate and that the results can be relied upon for interpretation.

Peterose Pty Ltd

15 May 2024

The General Manager
City of Parramatta Council
PO Box 32
Parramatta NSW 2124

Dear Sir/Madam

Offer to enter into planning agreement in relation to Site-Specific Planning Proposal to amend Parramatta Local Environmental Plan 2023
Property: 9 Albert & 31 O'Connell Street, North Parramatta

Introduction

Peterose Pty Ltd offers to enter into a Planning Agreement with Council under section 7.4 of the *Environmental Planning and Assessment Act 1979* in connection with the Site-Specific Planning Proposal at 9 Albert Street & 31 O'Connell Street, North Parramatta for the provision of public benefits as set out in this letter.

Peterose Pty Ltd has considered Council's Planning Agreements Policy (**Policy**) in the making of this offer.

Offer

Table 1 below sets out the details of the key terms of the offer, which is predicated on the approval and gazettal of the Planning Proposal. Full commercial terms are to be further resolved and agreed based on Council's Planning Agreement template, which will be issued separately once Council issues the template.

Table 1

Item	Terms
Parties	City of Parramatta Council (**Council**) Peterose Pty Ltd (**Developer**)
Land	1/DP1143431 – 9 Albert Street, North Parramatta 1/DP998240 – 31 O'Connell Street, North Parramatta
Planning Proposal / Development Application	Planning Proposal to amend the Parramatta LEP 2023 to increase the maximum building height and floor space ratio development standards to allow for a mixed use and high-density development, as followed; - Amending the maximum height of buildings map to permit 77m (inclusive of lift overrun)

Item	Terms
	- Amending the maximum floor space ratio map to permit 3.9:1
Monetary Contribution	$250,000 monetary contribution for upgrades relating to Belmore Park. Monetary contribution payable prior to the issue of a Construction Certificate.
Works	The Developer will, without charge to the Council and without offset from Developer Contributions dedicate the following number of apartments to Council in perpetuity for Affordable Housing; - 4 x 1 bedroom apartments; and, - 1 x 2 bedroom apartment
Dedication of Land	Not applicable
Other Public Benefits	The Developer will, without charge to the Council and without offset from Developer Contributions, construct an east-west site through link (opposite Harold Street) and register a public access easement over this portion of land prior to the issue of an Occupation Certificate.
Value of Public benefits	The estimated value of the Public Benefit Offer is $4,260,000.00 as outlined below: - Monetary Contribution: $250,000.00 - 4 x one-bedroom apartments: $2,860,000.00 - 1 x two-bedroom apartment: $1,150,000.00 - Easement: $0.00
Application of section 7.11, 7.12 and 7.24	This agreement does not exclude the application of section 7.11, 7.12 and 7.24 of the Act to the Development.
Dispute Resolution	This will be address in the subsequent Draft Agreement, but generally align with the template provisions.
Security	Not applicable, noting restrictions on issue of certificates.
Restrictions on Issue of Certificates	The Developer agrees that the VPA will restrict the issue of relevant Construction or Occupation Certificates to ensure the public benefits are delivered as per the agreed timing.
Other Terms	Not applicable
Costs	The Developer agrees to pay Council's reasonable costs of and incidental to the negotiation, preparation and entering into the agreement, as well as administration and

Item	Terms
	enforcement of the planning agreement in accordance with the terms set out in the template planning agreement.

Yours faithfully

Edward Doueihi

Director – Peterose Pty Ltd

PLANNING PROPOSAL

ITEM NUMBER	6.2
SUBJECT	Gateway Request - Parramatta CBD Supplementary Matters Planning Proposal
REFERENCE	F2023/00276 - N/A
APPLICANT/S	City of Parramatta Council
OWNERS	Multiple landowners
REPORT OF	Senior Project Officer

PURPOSE

To seek the Local Planning Panel advice on the Parramatta CBD Supplementary Matters Planning Proposal for land in the Parramatta City Centre for the purposes of seeking a Gateway Determination from the Department of Planning, Housing and Infrastructure (DPHI).

RECOMMENDATION

That the Parramatta Local Planning Panel (the Panel) consider the following Council Officer recommendation in its advice to Council:

(a) That Council approve the recommended pathways for resolving the outstanding "Orange Matters" arising from the exhibition of the Parramatta CBD Planning Proposal, as detailed in the table at **Attachment 1**.

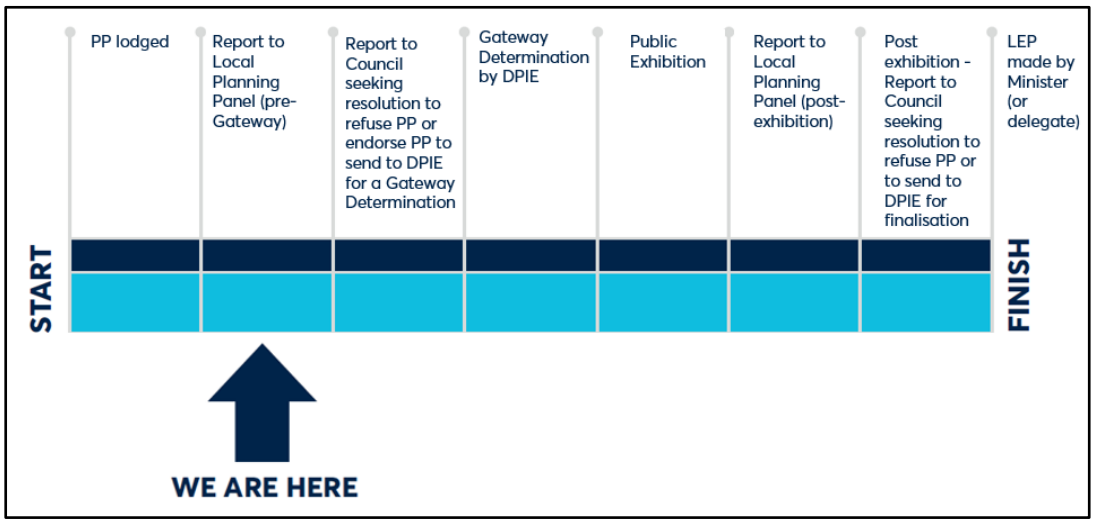
(b) That Council approve the Parramatta CBD Supplementary Matters Planning Proposal at **Attachment 2** for the purpose of seeking a Gateway Determination from the Department of Planning, Housing and Infrastructure.

(c) That Council advise the Department of Planning, Housing and Infrastructure that the CEO will be seeking to exercise its plan-making delegations for this Planning Proposal, as authorised by Council on 26 November 2012.

(d) That Council delegates authority to the CEO to correct any minor anomalies of a non-policy and administrative nature that arise during the plan-making process.

(e) That Council resolve to prepare a separate strategic precinct planning proposal for the Westfield site at 142 and 171 Church Street, Parramatta, given its strategic significance to the Parramatta CBD, and that Council officers prepare further urban design, land use and economic analysis to inform the policy framework for this planning proposal.

PLANNING PROPOSAL TIMELINE



BACKGROUND

1. Council finalised the Parramatta CBD Planning Proposal, which established a new planning framework for the Parramatta CBD, including new zoning, FSR, height and associated planning controls. The Parramatta CBD Planning Proposal was the result of extensive technical studies and community and stakeholder consultation over many years. The Parramatta CBD Planning Proposal was finalised as *Parramatta LEP 2011 (Amendment No 56)*, which was published on 6 May 2022 and came into effect on 14 October 2022.

2. During the exhibition period of the Parramatta CBD Planning Proposal, Council received submissions from landholders and other stakeholders seeking changes to controls for certain land within the Parramatta CBD. At its meeting of 15 June 2021, Council endorsed the final Parramatta CBD Planning Proposal with minor post exhibition changes and resolved to further investigate some matters raised from the submissions through a separate planning proposal process referred to in the Report as Decision Pathway 3 – Orange Matters. A list of the 'Orange Matters', as endorsed by Council 15 June 2021, is summarised in **Attachment 1** to this report.

3. The "Orange Matters" are generally outstanding matters remaining from the exhibition of Parramatta CBD Planning Proposal, that:

   (a) were generally consistent with Council's policy framework for the CBD, but were more significant changes, and if integrated into the Parramatta CBD Planning Proposal in the immediate post-exhibition period would have triggered re-exhibition of the Parramatta CBD Planning Proposal at that time; and/or

   (b) had some merit on preliminary review, but required further investigation to confirm whether they should be progressed.

FURTHER INVESTIGATION

4. In responding to the "Orange Matters" as resolved by Council on 15 June 2021, Council officers have undertaken further investigations, including:

   (a) evaluation of the nature and extent of requested changes from relevant submissions that resulted in the formation of the "Orange Matters";

   (b) assessment on the relevance of each "Orange Matter" against endorsed planning policy changes that have occurred at both the State and local level since Council's resolution on 15 June 2021 (now almost 3 years ago);

   (c) assessment of planning merits for certain "Orange Matters" against relevant strategic planning policies and directions; and

   (d) undertaking further urban design, land use planning and environmental sustainability analysis to inform suitable urban planning outcomes.

5. Following the completion of further investigations, Council officers have recommended two pathways, including justification, to address each of the "Orange Matters". These are articulated in detail at **Attachment 1**. In summary, the two pathways include the following:

   (a) matters that have strategic merit and are recommended to progress as a part of the Parramatta CBD Supplementary Matters Planning Proposal (provided at **Attachment 2**);

   (b) matters that are recommended to not proceed as a part of the Parramatta CBD Supplementary Matters Planning Proposal as they have since been resolved or superseded by another planning project or not considered to have adequate planning merit, or alternatively require significantly more analysis and are therefore recommended to proceed as a separate strategic precinct planning proposal.

PLANNING PROPOSAL

Overview

6. As outlined above, the Planning Proposal contained at **Attachment 2** to this report includes "Orange Matters" that are recommended by Council officers to progress to amend the Parramatta LEP 2023. In addition to addressing certain "Orange Matters", this Planning Proposal also makes an update to the BASIX points exceedance targets in clause 7.25(3)(c)(ii) of the Parramatta LEP 2023 (this is discussed in further detail in the table below).

7. This Planning Proposal has been prepared consistent with Council's endorsed position on 15 June 2021 in relation to the "Orange Matters" (refer to **Attachment 1**) and sections 3.31 & 3.33 of the *Environmental Planning and Assessment Act 1979* (the EPA Act). This Planning Proposal explains the intent and justification

for the amendments to Parramatta LEP 2023. The proposed amendments by this Planning Proposal include:

(a) rezoning of some land;

(b) extending the application of Area B of the Special Provisions Area Map to the rezoned land so that clause 7.28 (Additional floor space ratio for office premises) also applies;

(c) amendment to the land reservation acquisition area of some land;

(d) additional permitted use for the Parramatta CBD area; and

(e) amendment to some local provisions (i.e. car parking rates and high performing building design) applicable to the Parramatta CBD area.

8. The Planning Proposal is collectively referred as the 'Parramatta CBD Supplementary Matters Planning Proposal' and generally applies to the Parramatta City Centre and specific land within the Parramatta City Centre, as described in column 1 of Table 1 below.

Summary of Proposed Changes

9. Table 1 below provides a summary of the changes proposed under the Planning Proposal contained at **Attachment 2**.

Table 1 – Summary of changes proposed under the Planning Proposal

Site / Matter	Proposed Change(s)	Summary Justification
Land Reservation Acquisition (LRA) Map Notations: a. 328 Church Street, Parramatta (proposed lane); b. Marsden Lane, being part of 215 Church Street, Parramatta; c. Firehorse Lane, being part of 3 Fitzwilliam Street, and 25 Wentworth Street, Parramatta; d. Woodhouse Lane, being part of 21 Wentworth Street, Parramatta; e. Charles Street/Hassall Street Intersection, being part of 2 Charles Street, Parramatta; and f. Parkes Street widening, being part of 24 Parkes Street, Harris Park. **Orange Matter Initiator:** The LRA Map change in relation to 328 Church Street, Parramatta is in response to a landowner submission. The other proposed LRA Map amendments are in response to the findings of the	a. Deletion of entire LRA. b. Deletion of entire LRA. c. Partial deletion of LRA. d. Insertion of new splay corner LRA notation. e. Insertion of new road widening/splay corner LRA notation. f. Insertion of new road widening LRA notation.	The proposed LRA amendments are in response to the findings of the Parramatta Integrated Transport Plan (ITP) and updated urban design analysis, and they also minimise the financial implications for Council (ie. Overall, the proposed LRA removal area is significantly larger than the proposed new additions). The changes will improve safety, promote active transportation, and facilitate better traffic circulation and movement throughout the Parramatta CBD.

Parramatta CBD Integrated Transport Plan (ITP). **Note:** The submitter requested the changes that are recommended in the Planning Proposal. The other changes included in the Planning Proposal are consistent with relevant recommendations in the ITP.		
Walker Corporation Landholdings - 10-12 Darcy Street, Parramatta, also known as 4 & 6 & 8 Parramatta Square **Orange Matter Initiator:** Landowner submission to Parramatta CBD Planning Proposal. **Note:** The submitter requested the changes that are recommended in the Planning Proposal.	Rezone from MU1 Mixed Use zone to E2 Commercial Centre zone. Extend application of Area B of the Special Provisions Area Map to the rezoned land so that clause 7.28 (Additional floor space ratio for office premises) applies.	E2 Commercial Centre zone aligns with the current significant office tower development on site, and will enable consistency with the zoning and application of clause 7.28 to the other office towers at Parramatta Square. Expansion of the commercial core is supported by a study, being the Achieving A-Grade Office Space in the Parramatta CBD Economic Review (Urbis 2019)
High Performing Building Design – Clause 7.25 Update (applicable to residential development) **Orange Matter Initiator:** These updates are not a result of an "Orange Matter". Rather, the updates are needed as the BASIX system has been revised through the introduction and commencement of *State Environmental Planning Policy (Sustainable Buildings) 2022* in October 2023.	Updates the BASIX Energy exceedance targets as specified in clause 7.25(3)(c)(ii), so that for buildings with an FSR ranging from 6:1 to 16:1, developers would need to exceed BASIX standards by the following BASIX points in order to utilise the 5% FSR bonus: • 5-15 Storeys – 25 points • 16-30 storeys – 20 points • 31-40 storeys – 15 points • 41 or more storeys – 15 points	Updates are needed as the BASIX system has been revised through the introduction and commencement of *State Environmental Planning Policy (Sustainable Buildings) 2022* in October 2023. Updates are supported by a study, being the Parramatta High Performance Building Study Review (Kinesis, November 2023).
Additional land use permissibility – E2 Commercial Centre zone – Water recycling facilities **Orange Matter Initiator:** Parramatta River Catchment Group submission to Parramatta CBD Planning Proposal. **Note:** The submitter's requested change relating to 'water recycling facilities' permissibility has been recommended in the Planning	Add 'water recycling facility' as a permissible use with consent in the E2 Commercial Centre zone.	Will enable consistency between the MU1 Mixed Use zone and E2 Commercial Centre zone in the Parramatta CBD, noting that 'water recycling facilities' are currently permissible in MU1, but prohibited in E2. Further, this will also enable better alignment with clause 7.24 (Dual water systems). This change will enable maximum flexibility for recycled water systems, thereby improving environmental and sustainability outcomes.

Proposal. The submitter's requested change relating to 'water supply systems' permissibility has not been recommended in the Planning Proposal.		
Maximum Residential Car Parking Rate for certain land at North Parramatta (being the part of the Parramatta CBD north of Victoria Road) **<u>Orange Matter Initiator:</u>** The proposed changes to the car parking rates are in response to the findings of the Parramatta CBD Integrated Transport Plan (ITP). It is also noted that the car parking rates issue was raised in various submissions to the Parramatta CBD Planning Proposal, including from a landowner in the North Parramatta area of the CBD seeking to redevelop their site, Property Council of Australia, and also Transport for NSW. **Note:** The recommended changes in this Planning Proposal seeking to introduce Category A and B parking rates are consistent with the recommendations of the ITP and address the issues raised in the submissions received that relate to this matter.	Introduce a new Land Use and Transport Integration (LUTI) Map, which will identify Category A and B residential car-parking rate areas (refer to Figure 5 of **Attachment 1**). Category A will retain the current more restrictive maximum car parking rates, whereas Category B will introduce less restrictive maximum rates in the area of the Parramatta CBD north of Victoria Road. Amend the table in clause 7.17 to show the existing car parking rates for "Residential flat buildings, dual occupancies and multi dwelling housing" will apply to land shown as 'Category A' on the LUTI Map. Further, add a new Land Use type in the table for "Residential flat buildings, dual occupancies and multi dwelling housing – Category B land" (as shown on the LUTI Map), with the following rates: *"The sum of the following—* *Resident spaces:* *(a) 0.2 space for each studio dwelling* *(b) 0.4 space for each dwelling containing 1 bedroom* *(c) 0.8 space for each dwelling containing 2 bedrooms* *(d) 1.1 spaces for each dwelling with 3 or more bedrooms* *Visitor spaces (calculated cumulatively):* *(e) 0.167 space for each dwelling up to 30 dwellings* *(f) 0.1 space for each dwelling more than 30 and up to 70 dwellings* *(g) 0.05 space for each dwelling more than 70 dwellings"*	Changes will retain the current more restrictive maximum car parking rates for residential development on land to be referred to as Category A which has good access to heavy rail and metro stations. Less restrictive maximum car parking rates will apply to land referred to as Category B on land in the Parramatta CBD north of Victoria Road, as this land is located well away from heavy rail and metro stations. The new car parking framework is based on the recommendations of the Parramatta CBD Integrated Transport Plan (ITP).

STRATEGIC PRECINCT PLANNING PROPOSAL – PARRAMATTA WESTFIELD SITE

10. The Parramatta Westfield landholdings is situated at 142 and 171 Church Street, Parramatta, consisting of multiple blocks extending along Argyle Street, Aird Street, Marsden Street, Campbell Street, Fitzwilliam Street and Church Street – refer to Figure 1 below. The site is the single largest private land holding in the Parramatta CBD, measuring 6.43 ha in land area. In comparison, this is larger than Parramatta Square (including public domain) at about 2.84 ha, the Powerhouse Museum site at about 1.81 ha, and the Parramatta Metro site at about 1.76 ha, combined.

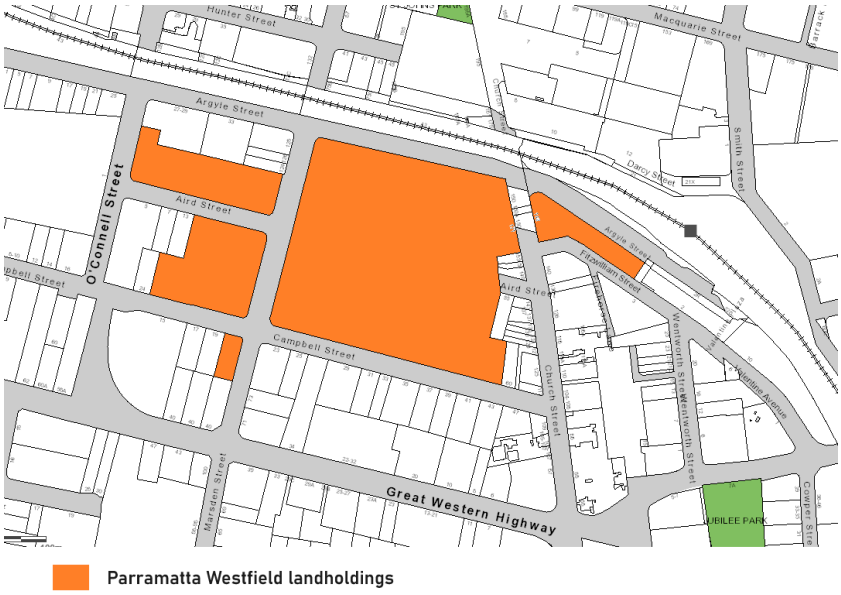


Figure 1 – Parramatta Westfield landholdings

11. Under the Parramatta CBD Planning Proposal ('CBD PP'), the site was proposed to be rezoned from B4 Mixed Use (now referred to as MU1 Mixed Use) to B3 Commercial Core (now referred to as E2 Commercial Centre). Under the CBD PP, it was also proposed to significantly increase heights and FSRs across the site, which would have resulted in a significant increase in density. Council officer's calculations indicate that under the CBD PP, *additional* GFA of 323,233sqm would have been permitted under the proposed FSR changes, which is a significant increase in floorspace capacity, being the equivalent of around 14 Sydney Water towers.

12. During the exhibition of the CBD PP, the landowner objected to the proposed rezoning. The primary basis for their objection at the time was the loss of flexibility in land uses offered by the proposed zone. Council consequently resolved to not progress the controls proposed under the CBD PP, and to undertake further investigations as a "orange matter". Council officers have further investigated this matter, which has included reviewing the previous urban design and economic studies undertaken as a part of the CBD PP that relate to this site, and also reviewing the draft zoning, height and FSR controls as exhibited for this site under the CBD PP.

13. In relation to the issue of land use flexibility, it is noted that the primary difference between the current MU1 Mixed Use zone and a proposed E2 Commercial Centre zone is the permissibility of residential development, noting that residential is permissible in the MU1 zone, but prohibited in the E2 zone. Aside from this, the E2 zone offers a flexible range of land uses to support a centre, and all typical centre-based land uses that are permissible in the MU1 zone are also permissible in the E2 zone. Notwithstanding the prohibition of residential in the E2 zone under *Parramatta LEP 2023*, it is noted that *State Environmental Planning Policy (Housing) 2021* ('the Housing SEPP') does offer build-to-rent housing as a permissible use in this zone, although acknowledging this cannot be subdivided and individually sold off.

14. Following these further investigations, Council officers are of the view that further analysis is needed to appropriately determine the future planning policy framework for this highly significant site. This further analysis needs to consider at least the following:

    a. **Land Economics** – The impacts of the COVID pandemic on both the office and retail market are continuing to evolve and will impact the future for this site. Further economic analysis is needed to help inform the policy framework for this significant site.

    b. **Land Use and Urban Design** – Given its strategic location near the Parramatta Transport Interchange and Parramatta Square, and also its large size, this site has significant potential in providing for future employment generation for the Parramatta CBD, in particular in large floor plate commercial office towers to match those of Parramatta Square. Further analysis is needed to determine the appropriate scale/type of residential development that would be suitable for the site, including site location considerations, so that strategic commercial and residential land use objectives can be properly balanced and managed.

15. In light of the above considerations, associated site complexities, and the significance of this large site in the Parramatta CBD, Council officers recommend not progressing this matter as a part of this planning proposal, and rather that Council commence preliminary work on a separate strategic precinct planning proposal specifically for the Westfield site, given its strategic importance, and also to allow more time where these issues can be further investigated.

PLANNING PROPOSAL ASSESSMENT

Strategic Merits

16. This Planning Proposal is consistent with the relevant Parramatta CBD planning framework. Further, it is noted that this Planning Proposal is supported by following technical studies, which were prepared to support the Parramatta CBD Planning Proposal:
    (a) Parramatta CBD Integrated Transport Plan (2021) (refer to Appendix 4 of the Planning Proposal at **Attachment 2**);
    (b) Achieving A-Grade Office Space in the Parramatta CBD Economic Review (Urbis, 2019) ("the Urbis study") (refer to Appendix 2 of the Planning Proposal at **Attachment 2**);

(c) Update of Parramatta Floodplain Risk Management Plans (Molino Stewart 2021) (refer to Appendix 5 of the Planning Proposal at **Attachment 2**).

17. Further, the Parramatta CBD High Performance Building Study Review (Kinesis, 2023) (refer to Appendix 3 of the Planning Proposal at Attachment 2) has also been prepared in support of this Planning Proposal in relation to the proposed updates to the BASIX exceedance targets in clause 7.25(3)(c)(ii) of the Parramatta LEP 2023.

18. Despite the Urbis study being completed prior to COVID and the pandemic's associated impacts on the office market, which continue to evolve, its recommendation to expand the CBD's commercial core to include the Walker landholdings at Parramatta Square is still considered valid given the significant commercial office towers that have since been completed at Parramatta Square. The rezoning of this land would also ensure consistency with the E2 Commercial Centre zoning of the other office towers at Parramatta Square, including the NAB Tower, Western Sydney University Tower, and the Sydney Water Tower.

19. The Planning Proposal demonstrates general consistency against relevant State Planning Policies and Ministerial Directions. It aligns with relevant planning priorities of the Greater Sydney Region Plan, the Central City District Plan, Local Strategic Planning Statement, Local Housing Strategy, Parramatta CBD Planning Strategy, Community Infrastructure Strategy, and Parramatta 2038 Community Strategic Plan. Further assessment of the strategic merits is provided at Part 3 of the Planning Proposal at **Attachment 2**.

Key Planning Considerations

Urban Design/Built Form and Economic Outcomes

20. The urban design/built form and economic considerations of the proposed changes under the Planning Proposal are summarised in Table 2 below.

Table 2 – Urban design/built form and economic considerations of the proposed changes

Proposed change	Urban Design/Built form & Economic considerations
Expansion of the E2 Commercial Centre zone and application of clause 7.28 (Additional FSR for office premises) over the Walker landholdings at Parramatta Square.	Expansion of the E2 Commercial Centre zone over the Walker Corporation Landholdings at Parramatta Square will allow for intensification of commercial and business uses on this land, which is centrally located close to the Parramatta Transport Interchange. The existing newly constructed commercial office towers at Parramatta Square are consistent with the proposed zoning. Expansion of the E2 Commercial Centre zone is also consistent with the recommendations of the *Achieving A-Grade Office Space in the Parramatta CBD Economic Review* (Urbis, 2019). Clause 7.28 allows proponents to exceed the maximum permissible FSR, but only if this is to be used for office premises. Further, in order to utilise clause 7.28, the site must have an area of at least 1,800sqm and a development control plan must be prepared which must provide for a number of matters, including compatibility with desired future character, minimising impacts on view corridors, land suitability, heritage and streetscape constraints, bulk and massing, street frontage heights, environmental impacts, and the public domain.

	These changes will reaffirm the significance of Parramatta Square as a major premium A-Grade office precinct as a part of the city's commercial core and will generate jobs and business opportunities.

Transport and Accessibility

21. Consistent with the Parramatta Integrated Transport Plan (ITP), this Planning Proposal includes amendments to several existing and proposed laneways, splay corners and road widenings, as outlined in Table 1. The proposed changes are in response to recent developments and urban design analysis, and will improve safety, active transportation, better traffic circulation, and movement throughout the Parramatta CBD.

22. The proposed new Category A and B parking policy framework for the Parramatta CBD (as outlined in Table 1) would serve as a driver to encourage a greater shift towards sustainable and active transport modes and investment in infrastructure that would support and facilitate the use of these modes, providing environmental, access and amenity benefits, which will be critical to the success of the city going forward. Enabling some more car parking spaces in Category B areas will provide improved car access for areas that are not well located close to heavy rail or metro stations. Further, it is noted that the proposed Category A and B parking policy framework is also consistent with the findings of the Parramatta ITP.

Sustainability and Environment

23. The Planning Proposal includes updates to the BASIX points exceedance targets in clause 7.25 (high performing building design) to ensure the incentive of providing high performing buildings in the Parramatta City Centre remains effective and up-to-date. This update would encourage high quality building design for efficient energy consumption and contribute to sustainable environmental outcomes.

24. The Planning Proposal also proposes to include new land use permissibility for 'water recycling facilities' in the E2 Commercial Centre zone. This is to allow flexible water management solutions for future development and encourage efficient water usage. Ensuring that 'water recycling facilities' are permissible in both the E2 Commercial Centre and MU1 Mixed Use zones across the entire Parramatta CBD area, and not just the MU1 zone (as is currently the case), will complement the requirements for dual water systems under clause 7.24, and will provide maximum flexibility for recycled water systems, thereby improving environmental and sustainability outcomes.

Flooding

25. Most land within the Parramatta CBD is flood affected. Developments within the Parramatta City Centre are regulated under clause 7.11 (Floodplain Risk Management) under the Parramatta LEP 2023 and other relevant flooding risk management plans and policies. The Planning Proposal is consistent with the relevant policy framework for the Parramatta CBD area, including clause 7.11 (Floodplain Risk Management) of Parramatta LEP 2023 and the Update of Parramatta Floodplain Risk Management Plans (Molino Stewart 2021) (refer to

copy at Appendix 5 of the Planning Proposal at **Attachment 2**), which was prepared to support the Parramatta CBD Planning Proposal.

26. This Planning Proposal does not seek amendments to any flooding controls applicable to the Parramatta CBD. The proposed increase in density envisaged through the expansion of the applicability of clause 7.28 (Additional floor space ratio for office premises) over the Walker landholdings (that is affected by the Probable Maximum Flood), is generally consistent with the overall density proposed under the exhibited Parramatta CBD Planning Proposal, which was supported by the Update of Parramatta Floodplain Risk Management Plans (Molino Stewart 2021). Therefore, continued application of clause 7.11 (Floodplain risk management) is considered appropriate to address any flooding risks.

27. Further details of above key planning considerations of the Planning Proposal are available at section 3.3.2 of the Planning Proposal at **Attachment 2.**

PLAN MAKING DELEGATIONS

28. Plan making delegations were announced by the then Minister for Planning and Infrastructure in October 2012 allowing councils to make LEPs of local significance. On 26 November 2012, Council resolved to accept the delegation for plan making functions, and for these functions be delegated to the Chief Executive Officer.

29. It is recommended that Council request to the Department of Planning, Housing and Infrastructure to exercise its plan making delegations for this Planning Proposal. This means that after the Planning Proposal has received a Gateway Determination, complied with any conditions (including any requirements for public exhibition), Council officers can deal directly with the Parliamentary Counsel on the legal drafting and finalisation of the amendment to the LEP facilitated by this Planning Proposal.

FINANCIAL IMPLICATIONS FOR COUNCIL

30. Under this Planning Proposal, 79sqm of land is being added to the Land Reservation Acquisition Map, but 1,098sqm is being removed, resulting in a net reduction of 1,019sqm of land being identified for acquisition by Council (refer to Table 3). This significant net reduction in land acquisition area will result in an associated net reduction in Council's financial liability in terms of acquisition costs, should the land not be secured through redevelopment opportunities.

Table 3 – Land area changes to Land Reservation Acquisition Map under the Planning Proposal

Site	Additions (sqm)	Retention (sqm)	Deductions (sqm)
2 Charles St, Parramatta (splay corner)	40		
24 Parkes St, Harris Park (road taper)	35		
Firehorse Lane, Parramatta (part removal)		71	473
21 Wentworth St, Parramatta (splay corner)	4		
215 Church St, Parramatta (Marsden Lane)			187

328 Church St, Parramatta (full removal)			438
Totals	**79**	**71**	**1,098**

CONCLUSION AND NEXT STEPS

31. Council officers have recommended two pathways to address the 'Orange Matters' resolved by Council on 15 June 2021. These are articulated in detail at **Attachment 1**. In summary, the two pathways include the following:
    (a) matters that have strategic merit and are recommended to progress as a part of the Parramatta CBD Supplementary Matters Planning Proposal (provided at **Attachment 2**);

    (b) matters that are recommended to not proceed as a part of the Parramatta CBD Supplementary Matters Planning Proposal as they have since been superseded or resolved by another planning project or not considered to have adequate planning merit, or alternatively require significantly more analysis and are therefore recommended to proceed as a separate strategic precinct planning proposal.

32. The Planning Proposal demonstrates both strategic and site-specific planning merits and is consistent with the Parramatta CBD planning policy framework, as established by the Parramatta CBD Planning Proposal. It is recommended the Planning Proposal be endorsed by Council and forwarded to the Department of Planning, Housing and Infrastructure for Gateway determination.

33. Following the consideration of the report by the Panel, a report will be prepared to Council incorporating advice from the Panel seeking a resolution to endorse the recommended pathways to address the outstanding "Orange Matters" arising from the public exhibition of the Parramatta CBD Planning Proposal (as detailed in **Attachment 1**) and progress the Planning Proposal contained at **Attachment 2**.

34. Further to the above, Council officers are also recommending that Council prepare a separate strategic precinct planning proposal for the Westfield site given its strategic importance, and also to allow more time for further urban design, land use and economic analysis to be undertaken.

Joyce Jiang
Senior Project Officer

Roy Laria
Team Leader Land Use Planning

Robert Cologna
Group Manager, Strategic Land Use Planning

Jennifer Concato
Executive Director City Planning and Design

ATTACHMENTS:

1⇩	Recommendations to the Parramatta CBD Planning Proposal "Orange Matters"	31 Pages
2⇩	Parramatta CBD Supplementary Matters Planning Proposal	436 Pages

REFERENCE MATERIAL

ATTACHMENT 1 – Summary of Council Officers' Recommendations to the Parramatta CBD Planning Proposal "Orange Matters"

This document outlines Council officers' recommendations and justification to address the list of "Orange Matters" as resolved by Council on 15 June 2021 in response to submissions received in relation to the public exhibition of the Parramatta CBD Planning Proposal.

"Orange Matters" listed in Table 1 and Table 2 of this document are based on two pathways recommended by Council officers, as follows:

- **Table 1** lists the matters that are supported and recommended to be progressed through the Parramatta CBD Supplementary Matters Planning Proposal.
- **Table 2** covers matters that have been resolved, superseded and/or are not supported, and are recommended to not proceed as a part of this Planning Proposal, or alternatively require significantly more analysis and are therefore recommended to proceed as a separate strategic precinct planning proposal.

Table 1 – 'Orange Matters' to be progressed via the Parramatta CBD Supplementary Matters Planning Proposal

Description of Orange Matter	Recommendation	Justification
Affected sites: Multiple existing and proposed laneways/splay corners/road widenings within the Parramatta CBD area, including: a. Marsden Lane, being part of 215 Church Street, Parramatta; b. Fire Horse Lane, being part of 3 Fitzwilliam Street, and 25 Wentworth Street, Parramatta; c. Woodhouse Lane, being part of 21 Wentworth Street, Parramatta; d. Charles Street/Hassall Street Intersection, being part of 2 Charles Street, Parramatta; and e. Parkes Street widening, being part of 24 Parkes Street, Harris Park. **Orange Matter (summary):** Council resolved to investigate any amendments to the Local Road Reservations following the public exhibition of the Integrated Transport Plan and endorsement by Council of any amendments as part of an alternative planning pathway. **Orange Matter Initiator:** The proposed Land Reservation Acquisition (LRA) Map amendments are in response to the findings of the Parramatta CBD Integrated Transport Plan (ITP). Note: The changes included in the Planning Proposal are consistent with relevant recommendations in the ITP.	Proceed as a part of this Planning Proposal.	Council officers have further investigated this matter following the public exhibition of the Parramatta CBD Integrated Transport Plan (ITP) and have recommended changes to be progressed as part of the Planning Proposal. The Planning Proposal seeks to amend the Land Reservation Acquisition (LRA) Map (including removals and additions) to five specific LRA matters, regarding laneways, splay corners and road widenings. The proposed LRA amendments are in response to the findings of the Parramatta ITP. The changes will improve safety, promote active transportation, and facilitate better traffic circulation and movement throughout the Parramatta CBD. Justification for each proposed LRA change is outlined as below: a. Full deletion of Marsden Lane is needed as it no longer serves any community purpose. The service lane is for access to private properties only, it is not required for use by the public and therefore there is no need for it to be acquired as a public laneway. b. The delivery of Fire Horse Lane as a shared zone has removed the need to widen along the extent of Fire Horse Lane, however the small portion at the bottom is still required to provide adequate width to convert the existing one-way section to two-way movement. c. Addition of a 3m x 3m LRA on the south-west corner of 21 Wentworth Street will improve convenience for turning vehicles, and also improve sight lines for oncoming traffic. d. The proposed new LRA on the south-west corner of 2 Charles Street will provide for better traffic circulation. This is to improve the view line of oncoming vehicles and facilitate better traffic circulation. e. Extension of the existing LRA from 26-30 Parkes Street LRA tapering to 24 Parkes Street will widen the left turn lane and improve safety and convenience for turning vehicles.

Recommendation:

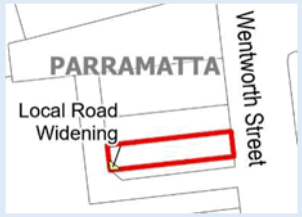
Current LRA under PLEP2023

Proposed LRA – Indicative

Proposal: Full deletion of current LRA notation (shown cross-hatched).

Proposal: Partial deletion of current LRA notation (shown cross-hatched).

n/a



Proposal: Insertion of new splay corner LRA notation (shown coloured yellow).

Further justifications for the proposed amendments are available in the Planning Proposal.

n/a **n/a**	 Proposal: Insertion of new road-widening/splay corner LRA notation (shown coloured yellow). Proposal: Insertion of new road-widening LRA notation (shown coloured purple).		
Affected site: 328 Church Street, Parramatta **Orange Matters (summary):** For 328 Church Street, Council resolved to investigate the financial implications for Council regarding the Land Reservation Acquisition notation as it currently applies to this land in relation to a proposed laneway.		Proceed as a part of this Planning Proposal.	Council officers have further investigated this matter and recommended a change to be progressed as part of the Planning Proposal. The Planning Proposal seeks to remove the entire LRA notation applying to 328 Church Street, Parramatta. Justification for the proposed amendment is summarised as below: • The LRA notation on the site has been in place for many years (prior to the Parramatta CBD Planning Proposal) and is an existing financial liability for Council. Should Council be required to acquire this site for a proposed laneway, Council officers estimate (based on a review of recent land sales in the Parramatta CBD) this would cost approximately $5.28 million to $10.12 million, which is a significant financial expense.

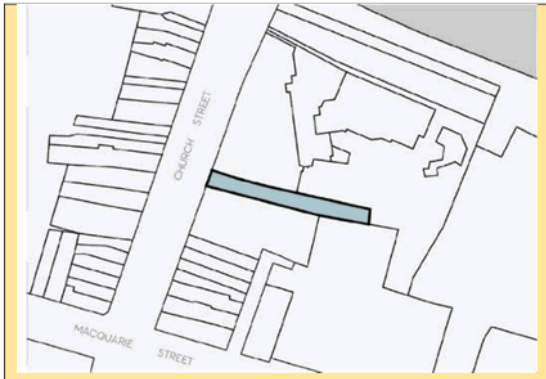


Figure 1 – Site location 328 Church St, Parramatta

Orange Matter Initiator:

Landowner submission to Parramatta CBD Planning Proposal.

Note: The submitter requested the changes that are recommended in the Planning Proposal.

Recommendation:

Current LRA

Proposed LRA

Proposal: Full deletion of current LRA notation to 328 Church St Parramatta

- Urban design analysis indicates there is a strategic need to establish pedestrian permeability in this street block by connecting Church Street to Phillip Lane, however instead of one wide 'open to the sky' laneway at 328 Church Street, this could instead be achieved through two thinner connections that could be either 'open to the sky' or covered arcades, depending on lot amalgamation in future developments. These connections could be articulated in a Development Control Plan (DCP) provision for this street block. Enabling these connections as a part of future developments removes the need for an LRA on 328 Church Street and the associated significant financial burden for Council in acquisition costs.

Further to the above, it is also noted that the original submission to the Parramatta CBD Planning Proposal also requested the removal of this LRA notation. At the time, the submission suggested an alternative where the site could be redeveloped inclusive of a 3 metre wide connection at the existing ground level, but redevelopment could occur in the airspace above the link. This suggestion in the submission at that time is generally consistent with the approach supported by Council officers now in this Planning Proposal, as discussed above.

As such, Council officers recommended to progress this matter as part of the Planning Proposal. Further justification for the proposed change is available in the Planning Proposal.

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Affected site:

Walker Corporation landholdings: 10-12 Darcy Street, Parramatta, also known as 4 & 6 & 8 Parramatta Square.

Orange Matter (summary):

For Walker Corporation landholdings at Parramatta Square, Council resolved to investigate rezoning the land from B4 Mixed Use (as exhibited) to B3 Commercial Core.

Orange Matter Initiator:

Landowner submission to Parramatta CBD Planning Proposal.

Note: The submitter requested the changes that are recommended in the Planning Proposal.

Recommendation:

<table>
<tr><td>Current control</td><td>MU1 Mixed Use zone</td></tr>
<tr><td>Proposed amendments</td><td>• Rezone from MU1 Mixed Use zone to E2 Commercial Centre zone.
• Extend application of Area B of the Special Provisions Area Map to the rezoned land so that clause 7.28 (Additional floor space ratio for office premises) applies.</td></tr>
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</td>
<td>Proceed as a part of this Planning Proposal.</td>
<td>

Council officers have further investigated this matter and recommend changes to be progressed as part of the Planning Proposal.

The Planning Proposal seeks to rezone part of the Walker Corporation landholdings from MU1 Mixed Use to E2 Commercial Centre (see Figure 3) and extend application of Area B of the Special Provisions Area Map to the rezoned land so that clause 7.28 (additional floor space ration for office premises) applies (see Figure 4). It is noted that in their original submission to the Parramatta CBD Planning Proposal, Walker Corporation had requested the application of the B3 Commercial Core zone (now referred to as E2 Commercial Centre zone) over their landholdings, given that the approved commercial office development is consistent with the B3 zone.

Figure 3 - Proposed area to be rezoned from MU1 to E2

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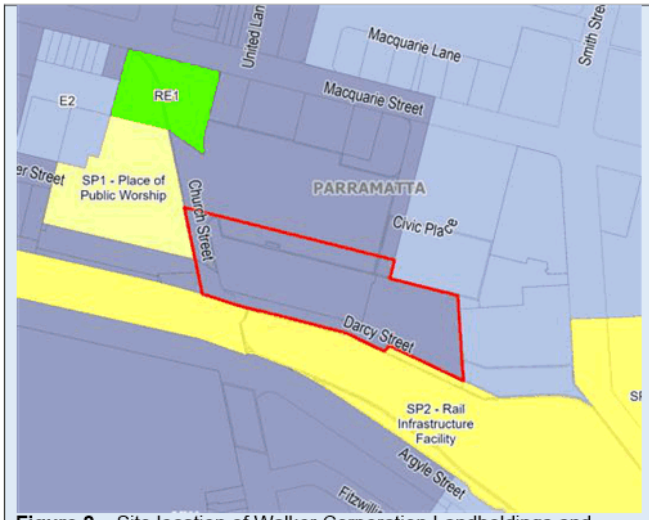


Figure 2 – Site location of Walker Corporation Landholdings and current zoning.

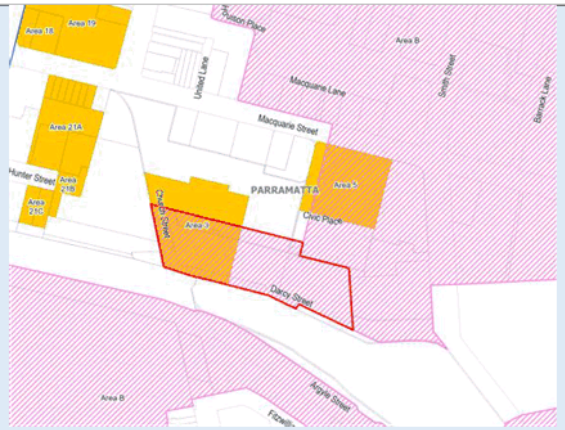


Figure 4 – Proposed area to which Area B of the Special Provisions Area Map will be extended

Justification for the proposed change is summarised as below:

- The current commercial office uses of these newly completed office towers at Parramatta Square strongly align with the objectives of the E2 Commercial Centre zone.
- Rezoning the land from MU1 Mixed Use to E2 Commercial Centre would ensure the continuity with the existing office uses, facilitation of employment, and intended use of Parramatta Square as a commercial core in the heart of the Parramatta CBD.
- The proposed amendment is also supported by the *Achieving A-Grade Office Space in the Parramatta CBD Economic Review* (Urbis 2019) prepared for the Parramatta CBD, which recommended the expansion of commercial core to include Parramatta Square to realise its potential to accommodate significant A-Grade office premises. Despite the *Achieving A-Grade Office Space in the Parramatta CBD Economic Review* (Urbis, 2019) being completed prior to COVID and the pandemic's associated impacts on the office market, its recommendations to expand the CBD's commercial core to include this land at Parramatta Square is still considered valid given the significant commercial office towers that have since been completed at Parramatta Square. The rezoning would also ensure consistency with the E2 Commercial Centre zoning of the other office towers at Parramatta Square, including the NAB Tower, Western

		Sydney University Tower, and the Sydney Water Tower, by extending the E2 Commercial Centre zoning west over the subject land. • The proposed extension of Area B of the Special Provisions Area map so that clause 7.28 of the Parramatta LEP 2023 applies – Clause 7.28 allows a building to exceed the maximum permissible FSR if the consent authority is satisfied the additional GFA will be used only for office premises. This will further incentivise additional office premises on this land if future circumstances allow this to happen. It will also enable consistency with the other towers in Parramatta Square where clause 7.28 also applies. As such, Council officers recommended to progress this matter as part of the Planning Proposal. Further justification for the proposed changes is available in the Planning Proposal.
Affected site: Land use permissibility within E2 Commercial Centre zone – 'water recycling facilities' **Orange matter (summary):** Council resolved to investigate the inclusion of 'water recycling facilities' as a permissible use within the E2 Commercial Centre zone and investigate the inclusion of 'water supply systems' within the E2 Commercial Centre and MU1 Mixed Use Zones, to provide for maximum flexibility for water supply systems. **Orange Matter Initiator:** Parramatta River Catchment Group submission to Parramatta CBD Planning Proposal. Note: The submitter's requested change relating to 'water recycling facilities' permissibility has been recommended in the Planning Proposal. The submitter's requested change relating to 'water supply systems' permissibility has not been recommended in the Planning Proposal.	Proceed as a part of this Planning Proposal.	Council officers have further investigated this matter and recommend changes to be progressed as part of the Planning Proposal. This Planning Proposal proposes to make 'water recycling facility' as permissible with consent in the E2 Commercial Centre zone, which applies to the Parramatta CBD area. This was in response to an issue that was raised by the Parramatta River Catchment Group in their submission to the Parramatta CBD Planning Proposal. Under Parramatta LEP 2023, 'water recycling facility' is defined as follows: *"**water recycling facility** means a building or place used for the treatment of sewage effluent, stormwater or waste water for use as an alternative supply to mains water, groundwater or river water (including, in particular, sewer mining works), whether the facility stands alone or is associated with other development, and includes associated—* (a) *retention structures, and* (b) *treatment works, and* (c) *irrigation schemes."* Land in the Parramatta CBD is predominantly subject to two zones, being E2 Commercial Centre and MU1 Mixed Use. However, 'water recycling facility' is permitted with consent only in the MU1 Mixed Use zone, but is prohibited in the E2 Commercial Centre zone. Under the Parramatta CBD Planning Proposal, clause 7.24 (Dual Water Systems) was introduced into Parramatta LEP 2023 across the entire Parramatta CBD area, which requires dual water reticulation systems

<table>
<tr>
<td><u>Recommendation:</u>

<table><tr><td>Current control</td><td>MU1 Mixed Use zone permits 'water recycling facility' with consent.

E2 Commercial Centre zone prohibits 'water recycling facility'.</td></tr><tr><td>Proposed amendments</td><td>Make 'water recycling facility' permissible with consent in the E2 Commercial Centre zone.
No change to current permissibility in the MU1 Mixed Use zone.</td></tr></table></td>
<td></td>
<td>containing pipes for potable water and recycled water for all inside and outside water uses in all new buildings. The purpose of this clause is to ensure the security of water supply in the Parramatta CBD.

Ensuring that 'water recycling facilities' are permissible in both the E2 and MU1 zones across the entire Parramatta CBD area, and not just the MU1 zone, will complement the requirements for dual water systems under clause 7.24, and will provide maximum flexibility for recycled water systems, thereby improving environmental and sustainability outcomes.

As such, Council officers recommend progressing the permissibility of 'water recycling facility' in the E2 zone as part of the Planning Proposal. Further justification for the proposed change is available in the Planning Proposal.

Further to the above, Council's analysis also considered 'water supply systems' as a potential permissible use, as originally suggested in the "orange matter". However, this was considered unnecessary as:

• 'water recycling facility' is sufficient to support the purpose of dual piping provision (clause 7.24) under the Parramatta LEP 2023;
• 'water recycling facility' includes all necessary requirements for the facility to produce an alternative water supply;
• addition of a 'water supply facility' is not needed to complement a 'water recycling facility'; and
• a 'water supply facility' will permit many uses that provide no benefit to the dual piping objectives in the Parramatta LEP 2023.</td>
</tr>
<tr>
<td><u>Affected site:</u>

Residential car parking rate for certain land at North Parramatta

<u>Orange matter (summary):</u>

Council resolved to investigate potential refinements to the car parking rates following the public exhibition of the Integrated Transport Plan and endorsement by Council of any amendments as part of an alternative planning pathway.</td>
<td>Proceed as a part of this Planning Proposal.</td>
<td>Council officers have further investigated this matter following the public exhibition of the Parramatta CBD Integrated Transport Plan (ITP) and recommend changes to be progressed as part of the Planning Proposal.

The ITP was finalised on 3 August 2021 and adopts two categories of parking rates, being Category A and Category B, as outlined in the table below:

<table><tr><th>Category</th><th>Maximum Parking Rate</th></tr><tr><td>Category A</td><td>0.1 spaces per studio dwelling
0.3 spaces per 1-bedroom dwelling
0.7 spaces per 2-bedroom dwelling
1 space per 3 or more bedroom dwelling</td></tr></table></td>
</tr>
</table>

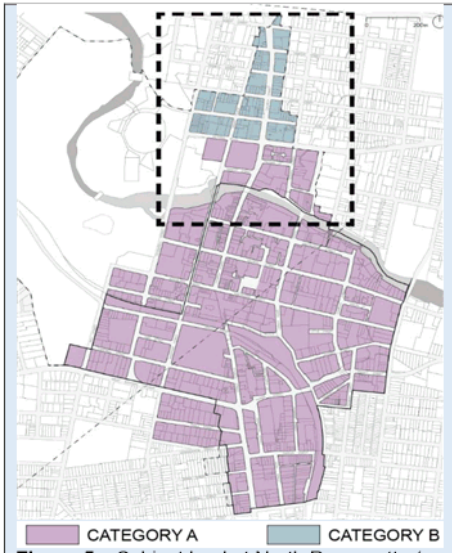


Figure 5 – Subject land at North Parramatta (marked as blue/Category B)

Orange Matter Initiator:

The proposed changes to the car parking rates are in response to the findings of the Parramatta CBD Integrated Transport Plan (ITP). It is also noted that the car parking rates issue was raised in various submissions to the Parramatta CBD Planning Proposal, including from a landowner in the North Parramatta area of the CBD seeking to redevelop their site, Property Council of Australia, and also Transport for NSW.

Note: The recommended changes in this Planning Proposal seeking to introduce Category A and B parking rates are consistent with the recommendations of the ITP and address the issues raised in the submissions received that relate to this matter.

Category B	0.2 spaces per studio dwelling 0.4 spaces per 1-bedroom dwelling 0.8 spaces per 2-bedroom dwelling 1.1 spaces per 3 or more -bedroom dwelling For each dwelling up to 30 dwellings – 0.167 spaces* For each dwelling more than 30 and up to 70 dwellings – 0.1 spaces* For each dwelling more than 70 dwellings – 0.05 spaces* *Note: These final 3 rates relate to the provision of visitor car parking and are calculated cumulatively. Whilst the reference to visitor parking is not explicitly made in the ITP, the original source of these rates is from clause 7.5 of Sydney LEP 2012, which does reference visitor car parking for these rates.

Currently, Parramatta LEP 2023 specifies the more restrictive Category A car parking rate for all residential development within the entire Parramatta CBD area, other than the area referred to as "Area A" on the Special Provisions Area Map, which preserves the original car parking rates from Parramatta LEP 2011. Consistent with the ITP and Council resolution of 15 June 2021, this Planning Proposal proposes to amend the car parking rate that is applicable to residential development for the subject land within North Parramatta, as shown as 'Category B' in Figure 5, to the higher maximum Category B car parking rates.

The allocation of categories in the ITP is based on proximity to stations (heavy rail and metro) within the Parramatta CBD area. Category B areas will permit a higher maximum rate of on-site parking for residential dwellings. This is due to their greater distance from the metro and rail stations, necessitating the likely need for more residents to own a car for their daily needs and visitors to use cars when accessing these areas. Under this Planning Proposal, the Category B areas have been identified in the northern part of the Parramatta City Centre, at land in North Parramatta located north of Victoria Road. This is land is located away from the metro and heavy rail stations on the fringe of the CBD and is consistent with the recommendations of the ITP.

The proposed new Category A and B parking policy framework would serve as a driver to encourage a greater shift towards sustainable and active transport modes and investment in infrastructure that would support and facilitate the use of these modes, providing environmental, access and amenity benefits, which will be critical to the success of the city going forward. Enabling some more car parking spaces in Category B areas will provide improved car access for areas that are not well located close to heavy rail or metro stations. Further, it is noted that the proposed Category A and B

Recommendation:

Current control	Multi dwelling housing with 1, 2 or 3 bedrooms and residential flat buildings The sum of the following— (a) 1 space for every dwelling, (b) 1 visitor space for every 5 dwellings *Note: Subject land falls within 'Area A', as identified on the Special Provisions Area Map, therefore clause 7.19 maximum car parking rates currently apply until 30 June 2024.*
Current control (from 1 July 2024 onwards)	Residential flat buildings, dual occupancies and multi dwelling housing The sum of the following— 0.1 space for each studio dwelling 0.3 space for each dwelling containing 1 bedroom 0.7 space for each dwelling containing 2 bedrooms 1 space for each dwelling with 3 or more bedrooms *Note: Subject land will be removed from 'Area A' from 1 July 2024 via State Environmental Planning Policy Amendment (Church Street North Precinct) 2023, and therefore general car parking rates under clause 7.17 will apply. These rates are consistent with the Category A rates as proposed in the Parramatta Integrated Transport Plan.*
Proposed amendments	• Insert a new 'Land Use and Transport Integration Map' into Parramatta LEP 2023. • Identify the subject land at North Parramatta as Category B on the new Land Use and Transport Integration Map, with all remaining land to be identified as Category A, as shown in Figure 5 above. • Category A land on the Land Use and Transport Integration Map to retain their existing car parking rates, but the residential car parking rates for Category B land will change to those shown below. • Amend the table to clause 7.17 to show the existing car parking rates for "Residential flat buildings, dual occupancies and multi dwelling housing" will apply to land shown as a 'Category A' on the Land Use and Transport

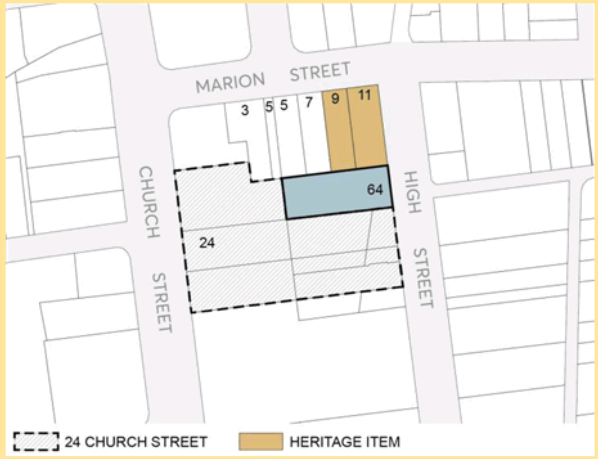
parking policy framework for the Parramatta City Centre is also consistent with the findings of the ITP.

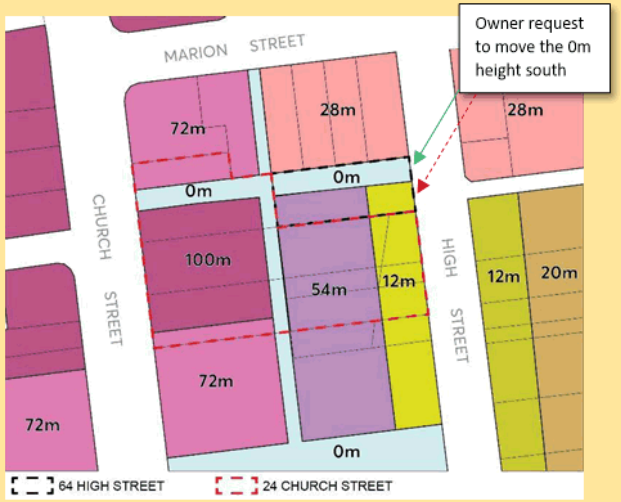
It is noted that the car parking rates issue was raised in various submissions to the Parramatta CBD Planning Proposal, including from a land owner in the North Parramatta area of the CBD seeking to redevelop their site, Property Council of Australia, and also Transport for NSW. The proposed changes in this Planning Proposal seeking to introduce Category A and B parking rates, consistent with the recommendations of the ITP, address the issues raised in these submissions.

As such, Council officers recommend progressing this matter as part of the Planning Proposal. Further justification for the proposed change is available in the Planning Proposal.

	Integration Map. Further, add a new Land Use type in the table for "Residential flat buildings, dual occupancies and multi dwelling housing – Category B land as shown on the Land Use and Transport Integration Map", with the following rates: Residential flat buildings, dual occupancies and multi dwelling housing - Category B land as shown on the Land Use and Transport Integration Map: The sum of the following— Resident spaces: (a) 0.2 space for each studio dwelling (b) 0.4 space for each dwelling containing 1 bedroom (c) 0.8 space for each dwelling containing 2 bedrooms (d) 1.1 spaces for each dwelling with 3 or more bedrooms Visitor spaces (calculated cumulatively): (e) 0.167 space for each dwelling up to 30 dwellings (f) 0.1 space for each dwelling more than 30 and up to 70 dwellings (g) 0.05 space for each dwelling more than 70 dwellings *Note: These rates are consistent with the Category B maximum car parking rates as proposed in the Parramatta Integrated Transport Plan.*			

Table 2 – Matters recommended to not proceed as a part of this Planning Proposal (i.e. resolved/superseded/not supported)

Description of Orange Matter	Recommendation	Justification
Affected site: 64 High Street, Parramatta and 24 Church Street, Parramatta **Orange Matter (summary):** Council resolved to investigate the realignment of the east-west laneway between High St and Church St shown on the Height of Building Map with a 0-meter height notation to the southern boundary of 64 High Street, Parramatta (refer to Figures 6 and 7).  **Figure 6** - Site location of 64 High Street and 24 Church St, Parramatta	Do not proceed as a part of this Planning Proposal.	Council officers have further investigated this matter and concluded that no further action is required, due to the concerns of undesired lot fragmentation to the existing large E2 Commercial Centre zoned land parcel at 24 Church Street, adjoining this site. As shown in Figure 7, the 0-metre height laneway is located at the northern boundary of both 64 High Street and 24 Church Street. Land located at 24 Church Street contains multiple lots fronting both Church Street and High Street and are under one single ownership. Sites at 9 & 11 Marion Street contain two heritage items listed with local heritage significance (refer to Figure 6). The 0-metre height laneway was originally proposed as part of the Parramatta CBD Planning Proposal and was intended to improve local road connectivity and safety. During the exhibition of the Parramatta CBD Planning Proposal, a submission was received on behalf of the landowner who owns the sites at 64 High Street as well as 7 & 9 Marion Street. The submission made a request to remove the 0-metre proposed laneway and delist the heritage item at 9 Marion Street, which was not supported by Council officers during the assessment of the Parramatta CBD Planning Proposal. However, at that time, Council officer acknowledged there maybe potential planning merits to realign the laneway. In reviewing this orange matter, while Council officers acknowledged that relocating the 0-metre height proposed laneway to the southern boundary of 64 High St would allow continuous developable area for sites at 7 & 9 Marion St and 64 High St, it would result in an undesired lot fragmentation of the E2 Commercial Centre zoned site at 24 Church St. This section of 24 Church St, which has a height limit of 100m and a regular shaped, contiguous area of approximately 2,400 sqm, is of a suitable size to accommodate a large floor plate commercial office tower in the future (refer to Figure 7). Retention of this site for a large floor plate commercial office tower fronting Church Street is also consistent with the findings of the Achieving A-Grade Office Space in the Parramatta CBD Economic Review (Urbis, 2019), which supported the Parramatta CBD Planning Proposal.

 **Figure 7** – HOB of 64 High Street and 24 Church Street (extract from HOB map of Parramatta LEP 2023) **Orange Matter Initiator:** Landowner submission to Parramatta CBD Planning Proposal.		As such, this orange matter is recommended to not proceed.
Affected site: MU1 Mixed Use zoned land in the block bound by Fitzwilliam Street, Parkes Street, Church Street and Wentworth Street **Orange Matter (summary):** Council resolved to undertake further investigation of the FSR only of the MU1 Mixed Use (previous B4) zoned land bound by Fitzwilliam Street, Parkes Street, Church Street and Wentworth Street at a later stage as a part of a separate piece of strategic work.	Do not proceed as a part of this Planning Proposal.	This matter arose from a submission from the former landowner of 7-9 Wentworth Street seeking an increase of FSR from 6:1 to 10:1. It is noted that Council is now the landowner of this site, where its new Administration Centre will be based in the Parramatta CBD. Urban design analysis of the MU1 Mixed Use zoned land in the block bound by Fitzwilliam Street, Parkes Street, Church Street and Wentworth Street was undertaken in response to this orange matter. The analysis noted that due to existing significant mixed use tower development and Council's car park in this block, the only real remaining potential development parcels were the sites at (showed coloured yellow at Figure 8):

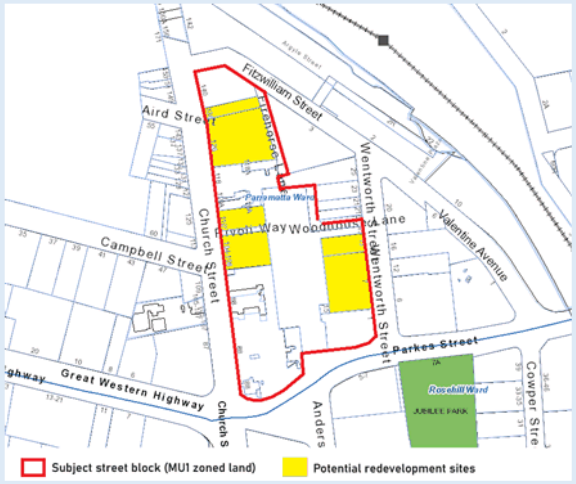


Figure 8 – Site location of subject street block

Orange Matter Initiator:

Landowner (7-9 Wentworth Street) submission to Parramatta CBD Planning Proposal. Note: Council is now the landowner of this site, where its new Administration Centre will be based in the Parramatta CBD from July 2024.

- 7-9 and 13 Wentworth Street
- 104-108 and 110-112 Church Street
- 126 and 136 Church Street

The urban design analysis found that the existing FSR of 6:1 should be retained for 7-9 and 13 Wentworth Street, and also Council's car park site, as there is no additional capacity within the Jubilee Park Solar Access Plane. Further, the analysis found there is some capacity for 104-108, 110-112, 126 and 136 Church Street to have a marginal increase in FSR, but this was subject to certain lot amalgamations and potential lane realignment. The additional capacity was due to the location of these sites further north in the Jubilee Park Solar Access Plane.

Give the unique site complexities associated with these Church Street sites involving certain lot amalgamations and potential lane realignment, it is recommended that any proposed increase in FSR be considered as future site-specific planning proposals, should landowners wish to pursue this pathway in consultation with Council.

As such, this orange matter is recommended to not proceed at this time as a part of this Planning Proposal.

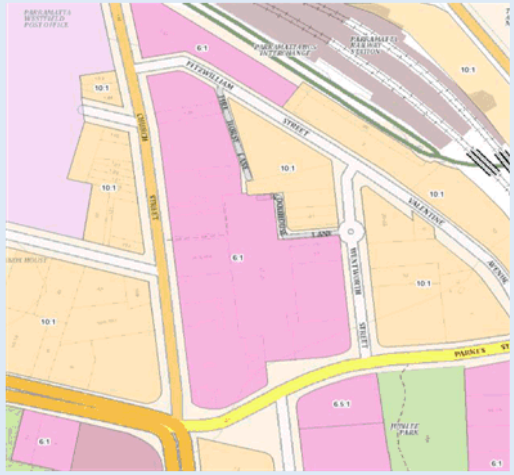


Figure 9 – Existing FSR 6:1 & 10:1 for the entire block (includes MU1 and E2 zoned land)

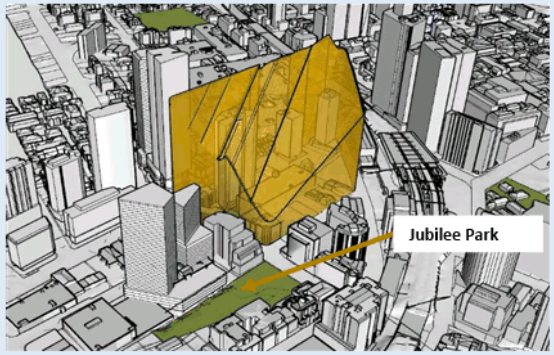


Figure 10 – Jubilee Park Solar Access Plane – looking north-west

Affected site: Roxy Theatre – 69 George Street, Parramatta **Orange matter (summary):** Council resolved to undertake further investigations to determine whether the height of building control applicable to the Roxy Theatre could potentially be increased to respond to strategic planning work for Civic Link and Sydney Metro, to allow possible transition of the building to a larger, modern theatre venue (including a 'fly tower'). **Figure 11** - Site location of Roxy Theatre relative to the new Metro Station	Do not proceed as a part of this Planning Proposal.	This site is currently heritage listed in both the LEP and State Heritage Register and has an FSR of 10:1 and a height control of 18m. In the original submission to the exhibition of the Parramatta CBD Planning Proposal, the landowner sought deletion of the proposed 18m height control (as exhibited), and to: (a) reinstate the former height control (which was in the range of 137m (RL) in the south-east corner to 179m (RL) in the north-west corner under the Lancer Barracks Sun Access Protection (SAP) plane), and (b) maintain the 10:1 FSR. In consideration of this submission at the time, Council officers noted that the height control of 18m was developed on the premise of ensuring the retention of the building's form and fabric and that any redevelopment would not compromise the heritage setting of the item. At the time, Council officers were of the view (based on outcomes from a Land and Environment Court case affecting the site) that the Roxy Theatre must be predominantly retained, which effectively ruled out any kind of tower element on the site. The 18m building height would bring the greatest public benefit because it not only ensures retainment of the theatre's building fabric and form, but also provides some room for minor adaptive additions. In response to the submission, Council resolved to undertake further investigations into a potential height increase to allow possible transition of the building to a larger, modern theatre venue. Urban design analysis to consider a potential height increase of 2m has since been undertaken in response to this orange matter, to help enable the building to potentially transition to a larger, modern theatre venue, including a fly tower. The urban design analysis noted that the Roxy was originally built as a cinema. It was not a performance theatre and therefore does not have space in plan and within the volume of the existing structure to accommodate back of stage functionality and a fly tower. The urban design analysis shows that increasing the height by 2m to an overall 20m height of building control could have a negative impact on the rear of the building where an addition is possible (see red shaded area in Figure 12). Retention of the 18m height control reinforces any likely addition at the rear to be below the ridge line of the existing hipped roof. This is a more sympathetic form which prioritises the main building fabric. As such, this orange matter is recommended to not proceed.

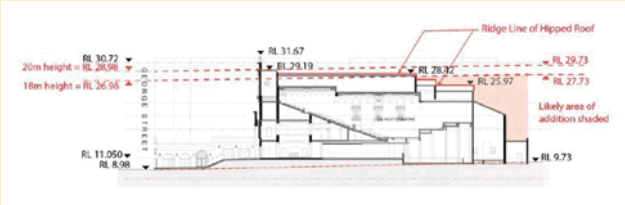
 **Figure 12** - Section of the Roxy showing the existing 18m height control. While some of the existing building is above the height, the likely area where an addition is possible (shaded red) is below the ridge line of the existing hipped roof. **Orange Matter Initiator:** Landowner submission to Parramatta CBD Planning Proposal, and also Council resolution of 15 June 2021, part (b2)(iv), which reads as follows: *"(iv) Reinstate the exhibited draft height control for the Roxy Theatre (69 George Street) of 18m when sending the CBD PP to DPIE for finalisation and undertake further investigations at a later stage (under Decision Pathway 3 – Orange), including heritage investigations, to determine if this height could potentially be increased to respond to strategic planning work for Civic Link and Sydney Metro, and also to allow possible transition of the building to a larger, modern theatre venue."*		
Affected site: 57 Macquarie Street, 41-43 Hunter Street, 45 Hunter Street and 87 Marsden Street, Parramatta **Orange matter (summary):** Council resolved to investigate the mapping of 57 Macquarie Street, 41-43 Hunter Street, 45 Hunter Street and 87 Marsden Street on the Additional Local Provisions Map with the Minimum Commercial Provision (MCP) notation. Note - The MCP provision, as proposed under the Parramatta CBD Planning Proposal, would have allowed unlimited commercial FSR.	Do not proceed as a part of this Planning Proposal.	Council officers have investigated this matter and are recommending to not proceed due to ongoing site-specific planning proposals at 45 Hunter Street and 57 Macquarie Street, as well as constrained site conditions (e.g. small site area, narrow site width) at 41-43 Hunter Street and 87 Marsden Street. The subject sites include five individual parcels and are located to the west of St John's Anglican Church site fronting Macquarie Street, Hunter Street and Marsden Street (see Figure 13). The sites are zoned MU1 Mixed Use with height of building controls of RL 211m and FSR 10:1 under Parramatta LEP 2023. The Parramatta CBD Planning Proposal proposed a Minimum Commercial Provision (MCP) clause and relevant mapping layer for certain MU1 Mixed

 Figure 13 – Site location of subject sites **Orange Matter Initiator:** Landowner submissions to Parramatta CBD Planning Proposal.		Use zoned lands, which required a minimum commercial provision of FSR 1:1 and allowed unlimited commercial FSR (beyond the required minimum 1:1) for sites that had an area of at least 1,800sqm. The proposed provision was intended to apply to lands in the vicinity of the subject sites, but not to apply to the subject sites under the Parramatta CBD Planning Proposal. The submitters requested the provisions (i.e. unlimited commercial FSR) be applied to the subject sites. However, during the finalisation of the Parramatta CBD Planning Proposal, the Department removed the proposed MCP provision and undertook a further review for those lands as part of the subsequent SEPP Amendment (Parramatta CBD) (No 2) 2022 ('SEPP 2'). SEPP 2 resolved to only give some lands an additional FSR 4:1 bonus for commercial premises – refer to clause 7.5 of Parramatta LEP 2023 ("Area 5" of the Additional Local Provisions Map"). In accordance with clause 7.5(3) and (4), this area must be used for commercial purposes and is subject to minimum dimension requirements. Further, SEPP 2 allows for a 5% FSR bonus for commercial development on lands identified as Areas 1, 2, 3, 4 and 5 of the Additional Local Provisions Map specified under clause 7.26 of Parramatta LEP 2023, subject to that development incorporating water sensitive urban design. It is noted that the Department's SEPP 2 did not support the 4:1 bonus commercial FSR for MU1 Mixed Use zoned land in the vicinity of the subject land, only the 5% commercial FSR bonus (for water sensitive urban design) was supported. In responding to this orange matter, Council officers have undertaken additional urban design analysis to test whether the subject sites present opportunities for additional commercial FSR. The urban design analysis considered sites at 41-43 Hunter Street (approx. 1,481sqm combined) and 87 Marsden Street (approx. 1,554sqm), but did not consider sites at 45 Hunter Street and 57 Macquarie Street, as these two sites are subject to separate site-specific planning proposal processes. The urban design analysis concluded that sites at 41-43 Hunter Street and 87 Marsden Street are not viable for commercial tower development. A 646sqm floorplate was tested for 87 Marsden Street. Given the site orientation, street frontage and inability to achieve inter-building separation and street setbacks, it is too small for a feasible commercial tower development. This is supported by the Achieving A-Grade Office Space in the Parramatta CBD Economic Review (Urbis, 2019), which recommended that a viable floorplate for commercial tower development within Parramatta CBD is at least 1,300sqm, with most major tenants wanting 1,500sqm.

		For 41-43 Hunter Street, the potential commercial floorplate would be even smaller, as the site is narrow in width and the combined site area is smaller than 87 Marsden Street, as outlined above. In addition, the site at 41 Hunter Street contains an existing heritage building, which further constrained the developable commercial floorplate area due to the setback from the heritage building and protection of heritage significance. As such this matter is recommended to not proceed.
Affected site: Two street blocks bound by Pitt Street, Campbell Street, Marsden Street and the Great Western Highway (refer to Figure 14). **Orange matter (summary):** Council resolved to investigate potential increased height and FSR controls for the two street blocks bound by Pitt Street, Campbell Street, Marsden Street and the Great Western Highway. **Figure 14** - Site location for the subject two street blocks	Do not proceed as a part of this Planning Proposal.	No further work is recommended in this precinct as this has been superseded by the work undertaken by the Department in preparing the Parramatta CBD Transition Area Review 2022 and State Environmental Planning Policy Amendment (Parramatta CBD) (No 2) 2022 ('SEPP 2'). As a result of this work and implementation of SEPP 2, these blocks are subject to the following: • 5% commercial FSR bonus where development incorporates water sensitive urban design (given the blocks are located within Areas 1 and 5 of the Additional Local Provisions Map, clause 7.26 is applicable) (refer to Figure 15); • A minimum 1:1 FSR must be allocated to commercial uses (given the blocks are located within Areas 1 and 5 of the Additional Local Provisions Map, clause 7.26 is applicable) (refer to Figure 15); and • The northern section of the eastern block (bound by O'Connell Street, Campbell Street, Marsden Street and Great Western Highway), shown as Area 5 of the Additional Local Provisions Map (refer to Figure 15), can pursue an additional 4:1 bonus FSR for commercial premises in accordance with clause 7.5 (subject to certain site and design requirements). Note - The mapped heights were not increased as a part of SEPP 2. Also, the FSRs on the FSR map were not changed, however additional bonus FSR was offered under SEPP 2 in the identification of Areas 1 and 5 in the Additional Local Provisions Map, as explained above. As such, Council officers recommend to not proceed with this matter as a part of this Planning Proposal as it has been considered and resolved as part of the Department's SEPP 2 process.

 Figure 15 – Additional Local Provisions Map (*extracted from Parramatta LEP 2023)* **Orange Matter Initiator:** Landowner submissions to Parramatta CBD Planning Proposal.		
Affected site: RE1 Public Recreation zone **Orange matter (summary):** Council resolved to investigate inserting new objectives for the RE1 (Public Recreation) zone related to protection and enhancement of ecological values, e.g. to preserve and enhance tree canopy, wildlife corridors and natural habitat, including waterways and riparian vegetation. **Orange Matter Initiator:**	Do not proceed as a part of this Planning Proposal.	Council officers have investigated this matter and concluded that this matter has been resolved as part of the Harmonisation LEP process, which was finalised in March 2023, now known as Parramatta LEP 2023. Following the finalisation of the Parramatta CBD Planning Proposal, a similar objective for the RE1 Public Recreation zone that captures this request has been adopted into the new Parramatta LEP 2023, as follows: ***Zone RE1 Public Recreation*** ***Objectives of zone*** • *To conserve, enhance and promote the natural and cultural heritage value of parks and open space in the zone.* *This objective replaced the previous zone objective for RE1 under the former Parramatta LEP 2011, as below:*

Environment, Energy and Science Group (State Government Agency) submission to Parramatta CBD Planning Proposal.		• *To conserve, enhance and promote the natural assets and cultural heritage significance of Parramatta Park.* As majority of Parramatta Riverbank corridor is zoned under RE1 Public Recreation, the updated zone objective specified the protection of ecological values for all parks and open space, including the Parramatta River riparian corridor, rather than just Parramatta Park. As such, this matter has been resolved as part of the Harmonisation LEP 2023 process and no further action is required.
Affected site: N/A - Related to provision of parking spaces for car share vehicles **Orange matter (summary):** Council resolved to consider an additional provision requiring parking spaces for car share vehicles in each new development. **Orange Matter Initiator:** Council Resolution on 15 June 2021, part (b1), based on Local Planning Panel (LPP) advice. Resolution reads as follows: *"(b1) That Council approve the inclusion in Table 3 of Attachment 1 ('Changes that have merit for further investigation (via Decision Pathway 3 - Orange)') consideration of an additional subclause in Clause 7.3 (parking) requiring the provision of parking spaces for car share vehicles in each new development."*	Do not proceed as a part of this Planning Proposal.	Council officers have further investigated the car share parking provision for new development and concluded that this item has been resolved as part of the Harmonisation DCP process finalised in May 2023, now known as Parramatta DCP 2023. Parking provision for carshare vehicles in new development has been addressed under controls *C.01 to C.06 of Section 6.1.1 - Carshare* of the Parramatta DCP 2023, which requires car share parking spaces for residential development of more than 50 units and commercial development with floor space of 5,000sqm or above. As such, this matter has been resolved and no further action is required.

Affected site: 56 Station Street East, Harris Park **Orange matter (summary):** Council resolved to investigate a potential increased height control for 56 Station Street East, Harris Park at a later stage as a part of a separate piece of strategic work. **Figure 16** – Site location of 56 Station Street East, Harris Park	Do not proceed as a part of this Planning Proposal.	The subject property at 56 Station Street East, Harris Park is zoned E2 Commercial Centre and has a site area of approximately 2,200sqm. The property has a FSR control of 10:1 and a height control of 72m, or an FSR of 11.5:1 and a height of 82.8m, when applying the 15% Design Excellence (DE) bonus. The site is also identified within Area B on the Special Provisions Area Map, which means it is subject to clause 7.28 that allows the land to exceed the maximum permissible FSR if the consent authority is satisfied the additional GFA will be used only for office premises. To utilise this bonus FSR under clause 7.28, sites must have a minimum area of 1,800sqm and a DCP addressing certain urban design matters must be prepared for the land. In response to this orange matter, urban design analysis was undertaken to assess the appropriateness of potential additional height on this site. The subject site is situated within the block bound by Hassall Street, Station Street East, Parkes Street and Charles Street. Lots within the block are mainly oriented north-south with frontages to both Hassell Street and Parkes Street. 56 and 60 Station Street East are the exception as corner lots (refer to Figure 16). 56 and 60 Station Street East are existing commercial buildings and zoned E2 Commercial Centre, whereas the remainder of the block is zoned MU1 Mixed Use. The predominant height within the subject site block is 72m. Taller, established tower controls on 5-7 Hassell Street and 11 Hassell Street are the exception. A potential tower at 5-7 Hassell Street has a permissible height of 122m (+ 15% DE bonus) and would be sited on the northern part of the property on Hassell Street with a significant setback (approximately 30m) from Parkes Street (given the land shape). The existing tower at 11 Hassell Street has a permissible height of 130m (+15% DE bonus) and is sited in the middle of the property with a generous setback (approximately 20m) from Parkes Street. This establishes a clear predominant scale to the north side of Parkes Street in this block, which matches with the 80m height datum along the west of the railway line south of Parkes Street, and also the established tower at 12A Parkes Street (refer to Figures 17 and 18). 56 Station Street East sits forward of other buildings along the northern side of Parkes Street (refer to Figure 16). It is located within a visually prominent location in the street and is an important building in establishing the continuity along Parkes Street and with the planned envelopes along the western side of the rail line.

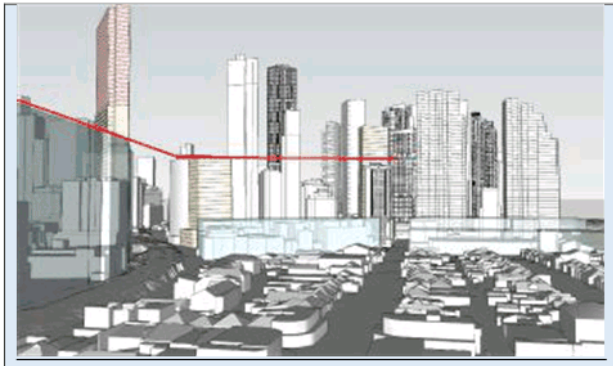


Figure 17 – View from HCA with 80m height datum along Parkes St north

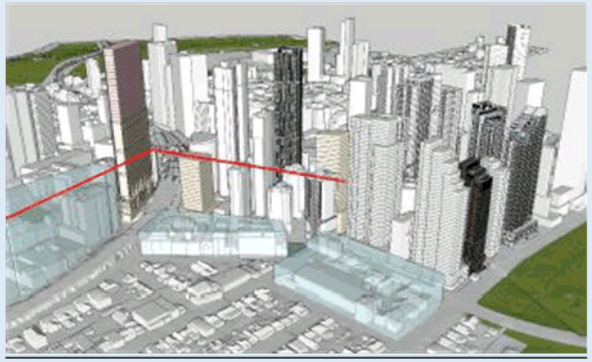


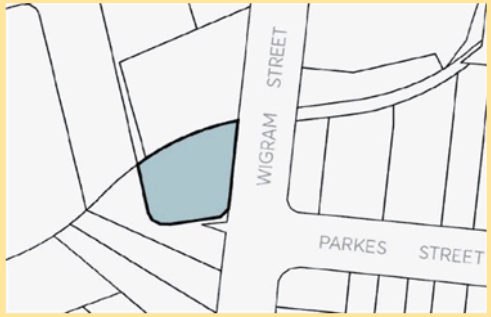
Figure 18 – Birds eye view with 80m height datum along Parkes St north

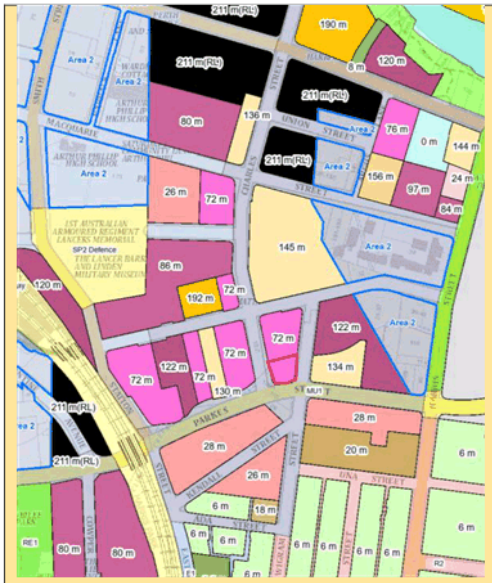
Orange Matter Initiator:

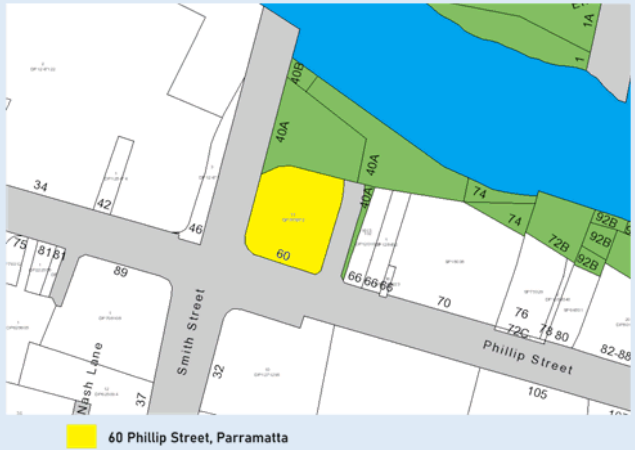
Landowner submission to Parramatta CBD Planning Proposal.

The urban design analysis recommended to maintain the LEP height of 72m for 56 Station Street East (equivalent 82.8m inclusive of 15% DE bonus) to reinforce the established and planned height datums along Parkes Street west of Wigram Street and along the rail line west of the HCA.

Given the result of the urban design analysis, this has not been included in this Planning Proposal.

Affected site: 12A Parkes Street, Harris Park **Orange matter (summary):** Council resolved to investigate potential increased height and FSR controls for 12A Parkes Street, at a later stage as a part of a separate piece of strategic work.  **Figure 19** – Site location - 12A Parkes Street, Harris Park	Do not proceed as a part of this Planning Proposal.	In the original submission to the Parramatta CBD Planning Proposal in relation to the subject site a request was made to increase the height from 72m to 122m, and to increase the FSR from 8:1 to 10:1. It is noted that additional FSR analysis was undertaken during the assessment of the DA modification (DA/1263/2016/B) for the new tower on the subject site, which resulted in an approved overall FSR of 10.23:1 (inclusive of a Design Excellence bonus and a justified variation). There was no variation to the current height control under the DA modification, with 2 additional floors being allowed through additional height permitted by utilising Clause 5.6 (Architectural roof features) of the Parramatta LEP 2023. The DA modification was approved on 15 October 2021, and the mixed use tower on site is now almost completely finalised in its construction. Further to the above, urban design analysis was also undertaken in relation to this orange matter. The urban design analysis indicates that the height of the newly constructed building on the subject site contributes to a stepped transition in building height from the block to the north bounded Macquarie Street, Charles Street and Hassall Street with a permissible height of 145m; to the subject site block bounded by Charles Street, Hassall Street, Wigram Street and Parkes Street with a permissible height of 72m; to the blocks south of Parkes Street with a height of 28m; and to the low scale Heritage Conservation Area (HCA) (refer to Figure 20). Retention of the existing height control of 82.8m (including Design Excellence) on the subject site also reinforces the predominant scale of the 80m height datum along Parkes Street north, and along the west of the railway line south of Parkes Street, as discussed above in relation to 56 Station Street East, Harris Park, which is located in close proximity to this site (refer to Figures 17 and 18). It is noted that Council also recently resolved on 8 April 2024 to endorse a site-specific planning proposal (SSPP) for 124 Wigram Street, Harris Park for the purposes of seeking a Gateway Determination from the Department of Planning, Housing and Infrastructure. This site immediately adjoins the subject site to the north. The SSPP proposes to increase the height of that site from 72m to 103m (118.45m including the Design Excellence bonus). The City Design team recommended this height to fit within the shadow of the block to the north and to reinforce the stepped skyline down to the HCA. Shadow analysis carried out by the City Design team indicates that the shadow of the development on the subject site at 12A Parkes Street (within its current height control of 82.8m, including Design Excellence) will be confined within the shadow of the block to the north (145m height control) and will have no additional adverse impact to the HCA.

 **Figure 20** – LEP Height Map. Subject site outlined in red. **Orange Matter Initiator:** Landowner submission to Parramatta CBD Planning Proposal.		Given the above considerations, this site has not been included in the Planning Proposal.

Affected site: 60 Phillip Street, Parramatta (refer to Figure 21) **Orange matter (summary):** For 60 Phillip Street, Council resolved to undertake further urban design investigations to determine if additional bonus FSR (under the high performing buildings, unlimited commercial floor space and Opportunity Sites clauses) can potentially be achieved within the height established under the exhibition version of the Parramatta CBD Planning Proposal, despite its size of approximately 1,580sqm (i.e. less than the 1,800sqm normally required to meet these FSR bonuses), given this site's unique circumstances as an isolated site bound by three public roads and the river foreshore.  **Figure 21** - 60 Phillip Street, Parramatta **Orange Matter Initiator:** Landowner submission to Parramatta CBD Planning Proposal.	Do not proceed as a part of this Planning Proposal.	In relation to the orange matter associated with 60 Phillip Street, Parramatta, it is noted that the Department's *State Environmental Planning Policy Amendment (Parramatta CBD) (No 2) 2022* ('SEPP 2') has now since applied bonus FSR controls to this site, as follows: • Clause 7.26 of Parramatta LEP 2023 applies, which requires a minimum 1:1 FSR be provided for commercial premises, and also allows a 5% FSR bonus for wholly commercial premises, where a development incorporates water sensitive urban design (as the site is identified in "Area 2" on the Additional Local Provisions Map). • Clause 7.28A of Parramatta LEP 2023 applies, which allows a bonus FSR of 3.5:1 to apply if the building is no more than 25m wide when viewed from Parramatta River (as the site is identified in "Area 2" on the Additional Local Provisions Map). The clause also allows a bonus height of 13m to apply. Further, it is noted that with these changes, the capacity of this site for a mixed use tower has increased from FSR 6.9:1, Height 92m (inclusive of bonuses) under former controls (Parramatta LEP 2011), to FSR 10.4:1, Height 105m (inclusive of bonuses) under current controls (Parramatta LEP 2023). Given the above provisions have now been inserted into Parramatta LEP 2023 via the Department's SEPP 2 process, this matter is now considered resolved and no further action is required in relation to 60 Phillip Street, Parramatta. Consequently, the matter is not included in the Planning Proposal.

Affected Site: Philip Street Block, Parramatta (refer to Figure 22) **Orange matter (summary):** Council resolved to undertake further investigation of building separation in the Phillip Street Block as a part of the Parramatta CBD DCP preparation. **Figure 22** - Phillip Street Block, Parramatta	Do not proceed as a part of this Planning Proposal.	In relation to the orange matter of building separation control for the Phillip Street Block (as per Council's resolution of 15 June 2021), *State Environmental Planning Policy Amendment (Parramatta CBD) (No 2) 2022* ('SEPP 2') introduced urban design requirements that requires maximum building width requirements, as specified under clause 7.28A of Parramatta LEP 2023. Further, Part 9 of Parramatta DCP 2023, particularly *Section 9.5.1.2 City East Block*, requires several river links of 6m or 8m wide to be delivered through the Phillip Street Block for public access. Those controls are intended to provide suitable building separations and facilitate the delivery of appropriate open-to-sky laneways for the block connecting the river to Phillip Street. Given these changes, the Council's resolution of 15 June 2021 in relation to building separation is now considered to be addressed and no further action is required. Further to the above, it should also be noted that Council is currently working on the following matters in the Phillip Street Block: (a) Assessment of a site-specific planning proposal (SSPP) for the site at 90-94 Phillip Street, Parramatta, located on the eastern side of the Phillip Street Block. This SSPP will consider height, FSR and building width requirements. It is anticipated this SSPP will be reported to Council for consideration in the coming months. (b) Assessment of a development application (DA/346/2023) for the site at 66 Phillip Street, Parramatta, for the restoration of an existing heritage cottage and adaptive reuse, the construction of a 22-storey commercial building, basement, and ground floor retail use. Urban design and heritage are key issues being considered in the assessment of this development application. (c) Preparation of a Phillip Street Block Urban Design Study, informed by the Parramatta River Strategy 2015, investigates the creation of an upper level promenade to provide flood egress and building activation

Orange Matter Initiator: Council resolution of 15 June 2021, part (b2)(iii), which reads as follows: *(iii) That as part of the preparation of the Draft Parramatta CBD Development Control Plan that controls be investigated to ensure that there are separations between buildings for the Phillips Street block (referred to in (i) above) from ground level upwards and including the tower elements to maintain visual and physical connectivity between the river and the broader CBD to the south."*		along the river frontage for properties within the block. The findings of this study may include additional considerations of suitable planning controls for the block to allow the delivery of the promenade. The study recommendations are expected later this year. Given the above considerations, this matter has not been included in the Planning Proposal but issues being investigated above may lead to this being reviewed and a future Planning Proposal being considered.
Affected site: Parramatta Westfield site – 142 & 171 Church Street, Parramatta (multiple blocks, extending along Argyle St, Aird St, Marsden St, Campbell St, Fitzwilliam St and Church St – refer to Figure 23) **Orange Matter (summary):** For the Westfield landholdings, Council resolved to investigate rezoning the land from B4 Mixed Use to B3 Commercial Core (as exhibited) with a potential Additional Permitted Use (APU) for a residential tower, consistent with the Urbis A-Grade Office Space Study recommendations (given the large size of this site that could accommodate both residential and commercial towers) and also further urban design analysis to determine the appropriate size of the residential tower (which would be referenced accordingly in an APU notation).	Do not proceed as a part of this Planning Proposal, rather, as a separate strategic precinct planning proposal specifically for the Westfield site given its strategic importance.	In their original submission to the Parramatta CBD Planning Proposal ('CBD PP'), Westfield objected to the proposed rezoning from B4 Mixed Use (now referred to as MU1 Mixed Use) to B3 Commercial Core (now referred to as E2 Commercial Centre). The basis for their objection at that time was for the following reasons: • The proposed zone lacks strategic merit because the *Achieving A-Grade Office Space in the Parramatta CBD Economic Review* (Urbis 2019) ('the Urbis study'), which supports the CBD PP, demonstrates there is already a sufficient pipeline of office floorspace to more than provide for the forecast need for office floorspace to 2036. • The job growth and additional floorspace predictions are no longer robust, in view of disruption and changing working practices as a result of the COVID 19 pandemic, plus the evidence of softening take up and increased vacancy rates. • The proposed zone is a more restrictive zoning and risks sterilising the land and limits development vitality, reducing flexibility. This increases development risk and uncertainty of supportive economic returns to trigger redevelopment of existing uses. This may impact investment interests. • Flexibility in land uses creates exciting, vibrant, active places throughout the day and night, where people live, work and spend leisure time in close proximity. Successful places support all three activities – and are best placed to attract investment and occupiers. • The proposed zone does not support the changing nature of shopping centres, the diversification of the uses and activity they support, and their growing connection and integral role to the communities they serve.

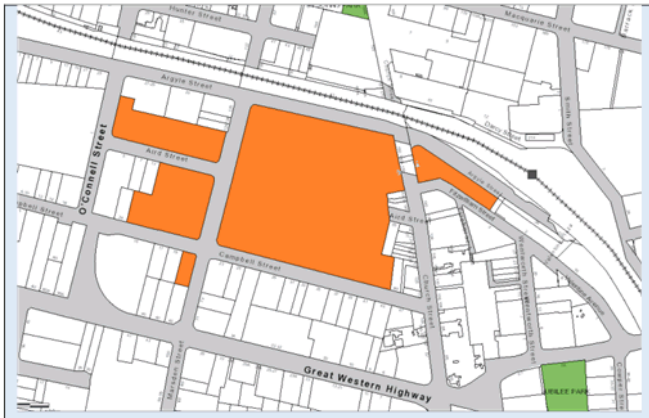


Figure 23 – Site location of Westfield landholdings.

Orange Matter Initiator:

Landowner submission to Parramatta CBD Planning Proposal.

Council officers have further investigated this matter, which has included reviewing the previous urban design and economic studies undertaken as a part of the Parramatta CBD Planning Proposal ('CBD PP') that relate to this site, and also reviewing the draft zoning, height and FSR controls as exhibited for this site under the CBD PP. It is noted that under the CBD PP, the scale of changes proposed for this site would have been significant. Council officer's calculations indicate that under the CBD PP, additional GFA of 323,233sqm would have been permitted under the proposed FSR changes, which is a significant increase in floorspace capacity, being the equivalent of around 14 Sydney Water towers.

In relation to the issue of land use flexibility, it is noted that the primary difference between the current MU1 Mixed Use zone and a proposed E2 Commercial Centre zone is the permissibility of residential development, noting that residential is permissible in the MU1 zone, but prohibited in the E2 zone. Aside from this, the E2 zone offers a flexible range of land uses to support a centre, and all typical centre-based land uses that are permissible in the MU1 zone are also permissible in the E2 zone, including amusement centres, commercial premises (includes business premises, office premises and retail premises), educational establishments, entertainment facilities, function centres, hotel or motel accommodation, medical centres and recreation facilities (indoor), to name a few key ones. Notwithstanding the prohibition of residential in the E2 zone under *Parramatta LEP 2023*, it is noted that *State Environmental Planning Policy (Housing) 2021* ('the Housing SEPP') does offer build-to-rent housing as a permissible use in this zone.

Following these further investigations, Council officers are of the view that further analysis is needed to appropriately determine the future planning policy framework for this highly significant site. This further analysis needs to consider at least the following matters:

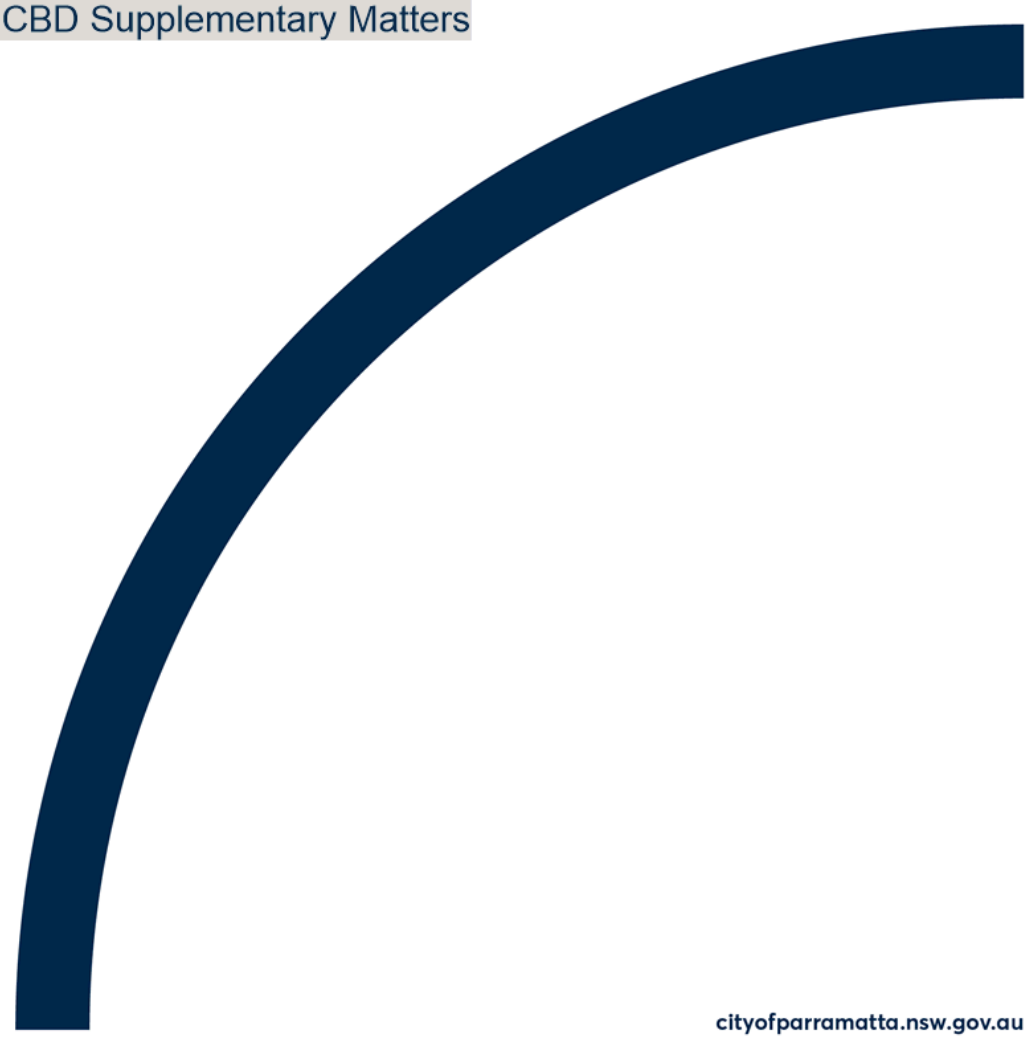
- **Land economics** – The impacts of the COVID pandemic on both the office and retail market are continuing to evolve and will impact the future for this site. Further economic analysis is needed to help inform the policy framework for this significant site.
- **Land use and urban design** – Given its strategic location near the Parramatta Transport Interchange and Parramatta Square, and also its large size, this site has significant potential in providing for future employment generation for the Parramatta CBD, in particular in large floor plate commercial office towers to match those of Parramatta Square. Despite this potential, the current MU1 Mixed Use zone does allow for residential flat buildings. Whilst a proposed rezoning to E2 Commercial

		Centre may prohibit residential flat buildings, build-to-rent housing would still be permissible under the Housing SEPP. The predominant difference between residential flat buildings in the current MU1 zone, and build-to-rent housing in a proposed E2 zone, is that the former can be subdivided and individually sold off, whereas the latter cannot be subdivided and remain in single ownership. Therefore, whilst increasing heights and FSRs on the site, as envisaged under the CBD PP, may significantly increase the capacity for office towers, it would likewise also increase capacity for build-to-rent housing. Given these complex factors, further land use and urban design analysis is needed to determine the appropriate scale/type of residential development that would be suitable for the site, including site location considerations, so that strategic commercial and residential land use objectives can be properly balanced and managed. In light of the above considerations, associated site complexities, and the significance of this large site in the Parramatta CBD, Council officers recommend not progressing this matter as a part of this planning proposal, and rather that Council commence preliminary work on a separate strategic precinct planning proposal specifically for the Westfield site, given its strategic importance, and also to allow more time where these issues can be further investigated.

CITY OF PARRAMATTA

PLANNING PROPOSAL

Parramatta CBD Supplementary Matters



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CITY OF PARRAMATTA

PLANNING PROPOSAL

Parramatta CBD Supplementary Matters

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Planning Proposal drafts

No.	Author	Version
1.	Council staff, City of Parramatta	May 2024 – Report to Local Planning Panel on the planning proposal

INTRODUCTION

1.1 Background and context

In April 2015, Council adopted the Parramatta CBD Planning Strategy ('the Strategy'). The Strategy set a framework for the preparation of Parramatta CBD Planning Proposal, which proposed changes to the planning controls applicable to the Parramatta CBD.

In April 2016, Council endorsed the draft Parramatta CBD Planning Proposal and forwarded it to the Department of Planning and Environment (DPE) (as it was then known) seeking a Gateway determination. Consistent with the conditions of the Gateway determination issued by DPE, the Parramatta CBD Planning Proposal was publicly exhibited between 21 September 2020 and 2 November 2020.

During the exhibition period, Council received submissions from landowners and other stakeholders seeking changes to certain land within the Parramatta CBD. At its meeting of 15 June 2021, Council endorsed the Parramatta CBD Planning Proposal with minor post exhibition changes and resolved to further investigate some matters raised in submissions received to be dealt with through a separate planning proposal process referred to in the report as 'Decision Pathway 3 – **Orange Matters**'. A list of the 'Orange Matters' and relevant Council resolution is attached as **Appendix 1** to this planning proposal.

The 'Orange Matters' are generally outstanding policy matters remaining from the Parramatta CBD Planning Proposal, as a result of submissions received, that generally:

a. were consistent with Council's policy framework for the CBD, but were more significant changes, and if integrated into the Parramatta CBD Planning Proposal in the immediate post-exhibition period would have triggered re-exhibition of the Parramatta CBD Planning Proposal at that time; and/or

b. had some merit on preliminary review, but required further investigation to confirm whether they should be progressed.

Following completion of the Parramatta CBD Planning Proposal, Council officers have undertaken research and further investigated the list of 'Orange Matters'. As a result, some 'Orange Matters' are now included as part of this planning proposal seeking amendments to the Parramatta Local Environmental Plan 2023 (Parramatta LEP 2023), and other matters are considered resolved and/or superseded via separate planning projects and have not been included.

Further to addressing certain 'Orange Matters' arising from the Parramatta CBD Planning Proposal process, this planning proposal also deals with updating the relevant BASIX exceedance targets as specified in clause 7.25(3) of the Parramatta LEP 2023 for high performing building design. The updates to clause 7.25(3) are needed as the BASIX system has been revised through the introduction and commencement of *State Environmental Planning Policy (Sustainable Buildings) 2022* in October 2023.

This planning proposal was endorsed by Council at their meeting of *[to be inserted the meeting date]* and has been prepared consistent with sections 3.31 & 3.33 of the *Environmental Planning and Assessment Act 1979* (the EPA Act), and the Local Environmental Plan Making Guideline 2023 published by the Department of Planning, Housing and Infrastructure (DPHI).

This planning proposal explains the intent and justification for the proposed amendments to Parramatta LEP 2023. The proposed amendments by this planning proposal include:

- rezoning of some land;
- extending the application of Area B of the Special Provisions Area Map to the rezoned land so that clause 7.28 (Additional floor space ratio for office premises) also applies;
- amendments to the land reservation acquisition area of some land;
- an additional permitted use for the Parramatta CBD area; and
- amendments to some local provisions (i.e. car parking rates and high performing building design) applicable to part of the Parramatta CBD area.

Affected Land

The planning proposal is collectively referred as the 'Parramatta CBD Supplementary Matters Planning Proposal' and generally applies to the Parramatta City Centre area, and specific land within the Parramatta City Centre, as described below:

1. Walker Corporation Landholdings – 10-12 Darcy Street, Parramatta (also known as 4 & 6 & 8 Parramatta Square).
2. Multiple laneways/splay corners/road widenings within the Parramatta CBD area, including:
    - Marsden Lane, being part of 215 Church Street, Parramatta;
    - Fire Horse Lane, being part of 3 Fitzwilliam Street, and 25 Wentworth Street, Parramatta;
    - Woodhouse Lane, being part of 21 Wentworth Street, Parramatta;
    - Charles Street/Hassall Street Intersection, being part of 2 Charles Street, Parramatta;
    - Parkes Street widening, being part of 24 Parkes Street, Harris Park; and
    - 328 Church Street, Parramatta.
3. Certain land at North Parramatta (being the part of the Parramatta CBD north of Victoria Road).

1.2. The Proposal

The sites included in the planning proposal are discussed below.

Amendments to Land Reservation Acquisition Map

The planning proposal includes amendments to the Land Reservation Acquisition (LRA) maps applicable to the Parramatta CBD, specifically at the following locations:

a. 328 Church Street, Parramatta (proposed lane);
b. Marsden Lane, being part of 215 Church Street, Parramatta;
c. Fire Horse Lane, being part of 3 Fitzwilliam Street, and 25 Wentworth Street, Parramatta;
d. Woodhouse Lane, being part of 21 Wentworth Street, Parramatta;

e. Charles Street/Hassall Street Intersection, being part of 2 Charles Street, Parramatta; and
f. Parkes Street widening, being part of 24 Parkes Street, Harris Park.

Multiple laneways/splay corners/road widenings

Consistent with the Council resolution of 15 June 2021, where Council resolved to: *"Investigate potential refinements to the car parking rates and any amendments to the **Local Road Reservations** following the public exhibition of the Integrated Transport Plan and endorsement by Council of any amendments as part of an alternative planning pathway",* this planning proposal seeks to amend the Land Reservation Acquisition (LRA) Map in relation to five specific matters regarding laneways, splay corners and road widenings, that were identified following the public exhibition of the Parramatta CBD Integrated Transport Plan (ITP).

The ITP was undertaken to inform the Parramatta CBD Planning Proposal, setting out a required plan to support the increased growth of employment and residents in the city. The ITP was publicly exhibited from 6 May 2021 to 3 June 2021. The proposed LRA changes were not incorporated into the ITP at that time, as the proposals would have triggered a re-exhibition of the ITP. As such, these proposed changes were deferred to this planning proposal.

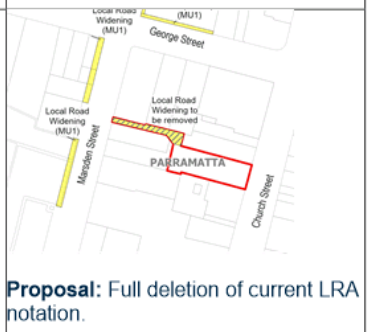
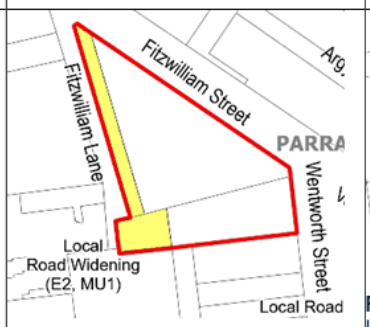
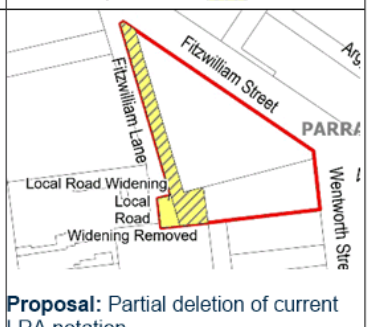
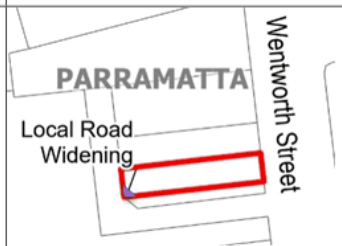
LRA at 328 Church Street, Parramatta

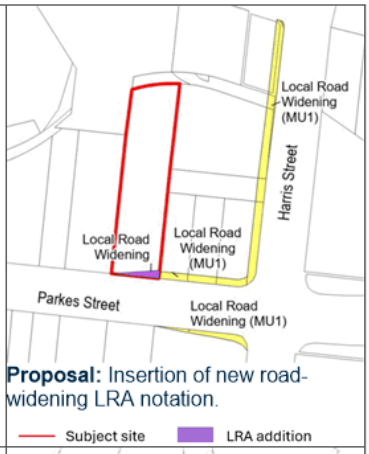
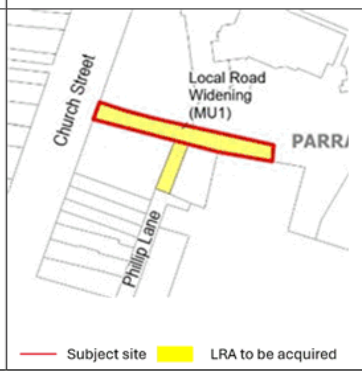
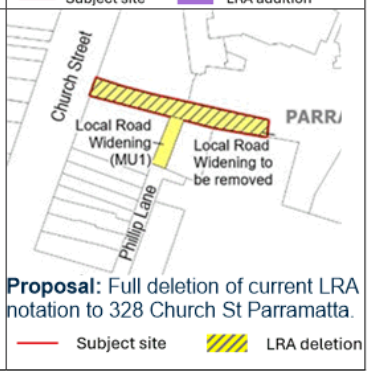
Council also resolved on 15 June 2021 to investigate the financial implications for Council regarding the Land Reservation Acquisition notation that currently applies to the site located at 328 Church Street, Parramatta as an 'Orange Matter'. The site is zoned MU1 Mixed Use under the Parramatta LEP 2023 with an approximate site area of 445sqm with a 7m frontage and 45m depth. The site has a mapped FSR of 10:1. However, given its small size, the site is subject to the FSR sliding scale at clause 7.3 of the Parramatta LEP 2023, and therefore results in an FSR of 6:1, without amalgamation with adjacent properties. The maximum height controls applicable are 12m, for the western portion of the site fronting Church Street (in the area 12m from the street boundary), and then RL 211m beyond that for the remaining portion of the site.
The LRA notation on the site has been in place for many years (prior to the Parramatta CBD Planning Proposal) and is an existing financial liability for Council. Should Council be required to acquire this site for a proposed laneway, Council officers estimate this would cost approximately $5.28 million to $10.12 million, which is a significant financial expense.

Urban design analysis indicates there is a strategic need to establish pedestrian permeability in this street block by connecting Church Street to Phillip Lane, however instead of one wide 'open to the sky' laneway at 328 Church Street, this could instead be achieved through two thinner connections that could be either 'open to the sky' or covered arcades, depending on lot amalgamation in future developments. These connections could be articulated in a Development Control Plan (DCP) provision for this street block. Enabling these connections as a part of future developments removes the need for an LRA on 328 Church Street and the associated significant financial burden for Council in acquisition costs. As such, this planning proposal seeks

to remove the entire LRA applicable to the site at 328 Church Street. Table 1 outlines the existing and proposed LRAs proposed as part of the planning proposal:

Table 1 – Current and Proposed LRAs (including removals)

LRA	Site location	Current LRA under PLEP2023	Proposed LRA - Indicative
1	Marsden Lane, being part of 215 Church Street, Parramatta		 **Proposal:** Full deletion of current LRA notation. Subject site LRA deletion
2	Fire Horse Lane, being part of 3 Fitzwilliam Street, and 25 Wentworth Street, Parramatta		 **Proposal:** Partial deletion of current LRA notation. Subject site LRA deletion
3	Woodhouse Lane, being part of 21 Wentworth Street, Parramatta	N/A	 **Proposal:** Insertion of new splay corner LRA notation. Subject site LRA addition
4	Charles Street/Hassall Street Intersection, being part of 2 Charles Street, Parramatta	N/A	**Proposal:** Insertion of new road-widening/splay corner LRA notation. Subject site LRA addition

5	Parkes Street widening, being part of 24 Parkes Street, Harris Park	N/A	
6	328 Church Street, Parramatta		

Conclusion

The proposed LRA amendments are in response to the findings of the Parramatta ITP and updated urban design analysis, and they also minimise the financial implications for Council as shown in Table 2 below, where the proposed LRA removal area is significantly larger than the proposed new additions. The changes will improve safety, promote active transportation, and facilitate better traffic circulation and movement throughout the Parramatta CBD.

Table 2 – proposed LRA area change (new additions and reductions)

Site	Additions (sqm)	Retention (sqm)	Deductions (sqm)
2 Charles Street, Parramatta (splay corner)	40		
24 Parkes Street, Harris Park (road taper)	35		
Fire Horse Lane – 3 Fitzwilliam and 35 Wentworth Street Parramatta		71	473
21 Wentworth Street Parramatta (splay corner)	4		
215 Church Street Parramatta (Marsden Lane)			187

328 Church Street Parramatta			438
Totals	**79**	**71**	**1,098**

Further justification of the proposed amendments is available at Part 3 of this planning proposal.

Walker Corporation Landholdings – 10-12 Darcy Street, Parramatta (also known as 4 & 6 & 8 Parramatta Square)

Council's resolution of 15 June 2021 resolved that Walker Corporation landholdings at Parramatta Square be further investigated for rezoning from MU1 Mixed Use (as per current controls and as exhibited under the Parramatta CBD Planning Proposal) to B3 Commercial Core, now referred to as E2 Commercial Centre.

The Walker Corporation landholdings are located directly adjacent to Parramatta railway station and are commonly known as 4 & 6 & 8 Parramatta Square. The land proposed to be rezoned has an area of approximately 9,727sqm and contains four existing commercial office towers and also parts of the Church Street and Darcy Street corridors (refer to Figure 1). The land is currently zoned MU1 Mixed Use with an FSR 10:1 (excluding part of the Darcy Street corridor, which has no FSR control). The building height control for the land is partially subject to a HOB of 200m or no height control (for land generally in the Parramatta Square public domain or the road corridors).

During the exhibition of the Parramatta CBD Planning Proposal, the landowner made a request to rezone the land from B4 Mixed Use to B3 Commercial Core (now referred to as MU1 Mixed Use and E2 Commercial Centre, respectively). Council recognised the planning merits to further investigate the proposed rezoning given the significant, recently completed office tower developments on the land.

Council officers have further investigated the proposed rezoning and consider that the current commercial office uses of these newly completed office towers at Parramatta Square strongly align with the objectives of the E2 Commercial Centre zone. Further, rezoning the land from MU1 Mixed Use to E2 Commercial Centre would ensure the continuity with the existing office uses, facilitation of employment, and intended use of Parramatta Square as a commercial core in the heart of the Parramatta CBD. The rezoning would also ensure consistency with the E2 Commercial Centre zoning of the other office towers at Parramatta Square, including the NAB Tower, Western Sydney University Tower, and the Sydney Water Tower, by extending the E2 Commercial Centre zoning west over the subject land (refer to Figure 1). The proposed amendment is also supported by the Urbis study - Achieving A Grade Office Space 2019 prepared for the Parramatta CBD which recommended the expansion of the commercial core to include Parramatta Square to realise its potential to accommodate significant A - Grade office premises. Table 3 outlines the existing and proposed controls for the subject land.

In addition to the proposed rezoning, and consistent with the original intent of the Parramatta CBD Planning Proposal for the B3 Commercial Core zone (now referred to as the E2 Commercial Centre zone), it is also proposed to extend the application of Area B of the Special Provisions Area Map to the rezoned land (as per Figure 1) so

that Clause 7.28 (Additional floor space ratio for office premises) of the Parramatta LEP 2023 applies. Clause 7.28 allows a building to exceed the maximum permissible FSR if the consent authority is satisfied the additional GFA will be used only for office premises. This will further incentivise additional office premises on this land if future circumstances allow this to happen.

Further justification of the proposed amendments is available at Part 3 of this planning proposal.

Table 3 – Current and proposed amendment – 10-12 Darcy Street, Parramatta (also known as 4 & 6 & 8 Parramatta Square - Walker Corporation Landholdings)

Current relevant control under Parramatta LEP 2023	MU1 Mixed Use zone
Proposed amendments	• Rezone from MU1 Mixed Use zone to E2 Commercial Centre zone. • Extend application of Area B of the Special Provisions Area Map to the rezoned land so that clause 7.28 (Additional floor space ratio for office premises) applies.

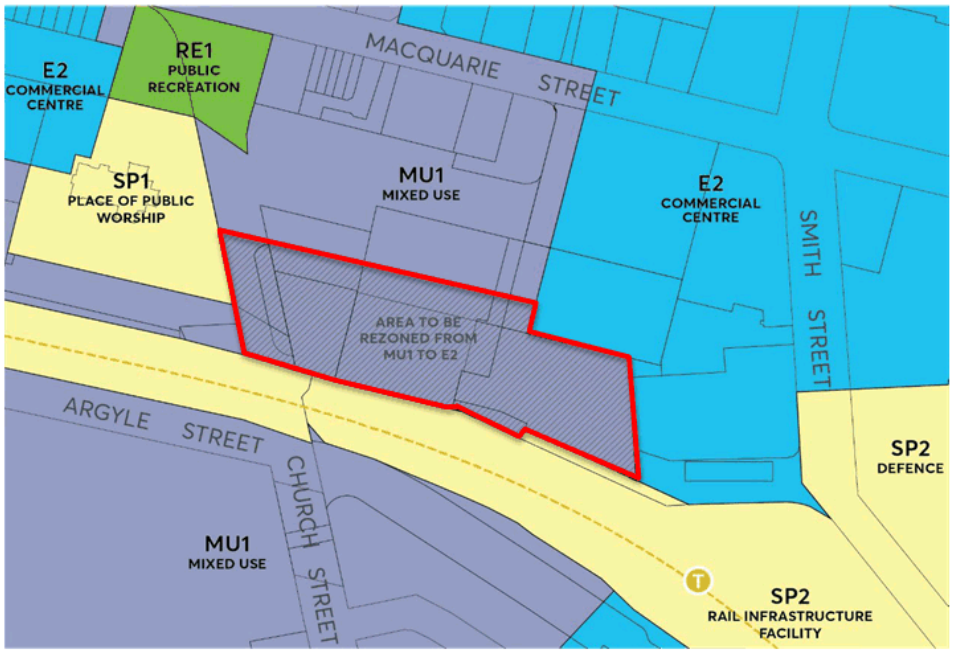


Figure 1 – Land proposed to be rezoned from MU1 Mixed Use to E2 Commercial Centre (shown in thick red edging)

Figure 2 – Recently completed commercial office towers on Walker Corporation Landholdings at Parramatta Square, which is subject to rezoning under this planning proposal (known as 4 & 6 & 8 Parramatta Square).

High Performing Building Design – Clause 7.25 Update

This planning proposal includes amendments to Clause 7.25 High Performing Building Design of the Parramatta LEP 2023. Clause 7.25 of the Parramatta LEP 2023 incentivises high performing building design that minimises energy and water consumption in new residential and mixed-use developments through a floorspace bonus scheme. The 5% bonus incentive floor space offered under the clause is achievable when development can demonstrate it can exceed BASIX targets by a specified number of BASIX points, based on development size, which are articulated in the table contained within the clause.

However, the BASIX system has been revised through the introduction and commencement of *State Environmental Planning Policy (Sustainable Buildings) 2022*

('Sustainable Buildings SEPP') in October 2023 since the clause was finalised. This includes revised compliance targets as well as BASIX calculator updates that incorporate policy, technology and industry trends. Given these updates to BASIX, Council officers engaged consultants Kinesis to assess the impacts of these updates to the BASIX system and recommend updated BASIX exceedance targets for inclusion in clause 7.25 to trigger the bonus. This is to ensure the controls are continuing to incentivise high performing buildings in the Parramatta CBD and therefore improved environmental outcomes.

The proposed amendments to Clause 7.25 are minor in nature and relate only to an update of the table at clause 7.25(3)(c)(ii), which articulates the BASIX exceedance targets that trigger the bonus. These updated BASIX exceedance targets are supported by the Parramatta High Performance Building Study Review prepared by Kinesis (refer to **Appendix 3**). The study concluded that the proposed new BASIX exceedance targets are achievable for new residential and mixed-use development across the Parramatta CBD area. It should be noted that these changes relate to BASIX exceedance targets for energy only, there was no change recommended by Kinesis to the BASIX exceedance targets for water of 15 points, as specified in clause 7.25(3)(c)(i). Further justification of these updates to the BASIX exceedance targets for energy can be found in Part 3 of this planning proposal. Table 4 outlines the current and proposed BASIX Energy exceedance targets specified under Clause 7.25(3)(c)(ii):

Table 4 - Current and proposed BASIX Energy exceedance targets

Height of Building	**Current**		**Proposed**
	Building with FSR of at least 6:1 but less than 14:1	*Building with FSR of at least 14:1*	***Building with FSR ranging from 6:1 to 16:1***
	BASIX Points	BASIX Points	**BASIX Points**
5-15 storeys	25	15	**25**
16-30 storeys	20	10	**20**
31-40 storeys	10	10	**15**
41 or more storeys	10	10	**15**

Additional land use permissibility - E2 Commercial Centre – Water recycling facilities

This planning proposal introduces a new land use of 'water recycling facility' to be permitted in the E2 Commercial Centre zone in the Parramatta CBD area. The proposed amendment is a result of further investigation as per Council's resolution of 15 June 2021, which was to investigate the inclusion of 'water recycling facilities' as a permissible use within the E2 Commercial Centre zone (previously referred to as the B3 Commercial Core zone). Under Parramatta LEP 2023, 'water recycling facility' is defined as follows:

*"**water recycling facility** means a building or place used for the treatment of sewage effluent, stormwater or waste water for use as an alternative supply to mains water, groundwater or river water (including, in particular, sewer mining works), whether the*

facility stands alone or is associated with other development, and includes associated—
(a) *retention structures, and*
(b) *treatment works, and*
(c) *irrigation schemes."*

Under Parramatta LEP 2023 ('PLEP 2023'), land in the Parramatta CBD is predominantly subject to two zones, being E2 Commercial Centre and MU1 Mixed Use. However, 'water recycling facility' is permitted with consent only in the MU1 Mixed Use zone but prohibited in the E2 Commercial Centre zone.

Under the Parramatta CBD Planning Proposal, clause 7.24 (Dual Water Systems) was introduced into PLEP 2023 across the entire Parramatta CBD area, which requires dual water reticulation systems containing pipes for potable water and recycled water for all inside and outside water uses in all new buildings. The purpose of this clause is to ensure the security of water supply in the Parramatta CBD.

Ensuring that 'water recycling facilities' are permissible in both the E2 and MU1 zones across the entire Parramatta CBD area, and not just the MU1 zone, will complement the requirements for dual water systems under clause 7.24, and will provide maximum flexibility in permissibility for recycled water systems. This will help improve environmental and sustainability outcomes in the Parramatta CBD. Table 5 outlines the current and proposed permissibility under this planning proposal. Further justification of the proposed amendment can be found in Part 3 of this planning proposal.

Table 5 – current and proposed controls – new land use permissibility

Current relevant control under Parramatta LEP 2023	MU1 Mixed Use zone permits 'water recycling facility' with consent. E2 Commercial Centre zone prohibits 'water recycling facility'.
Proposed amendments	Make 'water recycling facility' permissible with consent in the E2 Commercial Centre zone. No change to current permissibility in the MU1 Mixed Use zone.

Maximum Residential Car Parking Rate for certain land at North Parramatta (being the part of the Parramatta CBD north of Victoria Road)

On 15 June 2021, Council resolved to investigate potential refinements to car parking rates for the Parramatta CBD following the public exhibition of the Parramatta CBD Integrated Transport Plan (ITP). The ITP was required to be prepared under a condition of the Parramatta CBD Planning Proposal's Gateway Determination (issued December 2018). The ITP was finalised on 3 August 2021 and submitted to the former Department of Planning and Environment. The ITP adopts two categories of parking rates, being Category A and Category B, as outlined in Table 6. A copy of the ITP is

available at Appendix 4 to this planning proposal (refer to section 5 and Figure 93 in the ITP, which shows the recommended Category A and B areas).

Table 6 - ITP recommended residential car parking rates for Parramatta CBD

Category	Maximum Parking Rate
Category A	0.1 spaces per studio dwelling 0.3 spaces per 1-bedroom dwelling 0.7 spaces per 2-bedroom dwelling 1 space per 3 or more bedroom dwelling
Category B	0.2 spaces per studio dwelling 0.4 spaces per 1-bedroom dwelling 0.8 spaces per 2-bedroom dwelling 1.1 spaces per 3 or more -bedroom dwelling For each dwelling up to 30 dwellings – 0.167 spaces* For each dwelling more than 30 and up to 70 dwellings – 0.1 spaces* For each dwelling more than 70 dwellings – 0.05 spaces* **Note: These final 3 rates relate to the provision of visitor car parking and are calculated cumulatively. Whilst the reference to visitor parking is not explicitly made in the ITP, the original source of these rates is from clause 7.5 of Sydney LEP 2012, which does reference visitor car parking for these rates.*

Currently, Parramatta LEP 2023 specifies the more restrictive Category A car parking rate for all residential development within the entire Parramatta CBD area, other than the area referred to as "Area A" on the Special Provisions Area Map, which preserves the original car parking rates from Parramatta LEP 2011 (due to this area not being subject to change under the Parramatta CBD Planning Proposal – refer to Figure 4). Consistent with the ITP and Council resolution of 15 June 2021, this planning proposal proposes to amend the car parking rate that is applicable to residential development for the subject land within North Parramatta, as shown as 'Category B' in Figure 3, to the Category B rate (as described in Table 6).

Figure 3 – Land subject to proposed 'Category B' Residential Car Parking rate at North Parramatta and remaining land in the Parramatta CBD to retain their current parking rates (proposed to be referred to as 'Category A')

The allocation of categories in the ITP is based on proximity to stations (heavy rail and metro) within the Parramatta CBD, which is similar to the approach used in the Sydney CBD. Figure 3 shows the proposed Category B location under this planning proposal, which has been derived from the ITP. All other areas of the Parramatta CBD (except the preserved area identified as 'Area A' on Special Provisions Area Map) would retain their current maximum parking controls and would be labelled as Category A on a new 'Land Use and Transport Integration Map', which is similar to the approach used in the Sydney LEP 2012 (refer to Figure 3 above and also Figures 4, 5 and 6 below, which show in order the proposed timeline of changes to the parking controls, as applicable to the Parramatta CBD area). As Category A land is closer to the stations, the maximum parking rates are more restrictive, whereas given that Category B land is on

the fringe of the CBD area in North Parramatta, the maximum parking rates are less restrictive and would allow more car parking. Table 7 includes the current and proposed residential car parking rates. Further justification and intended outcomes are available at Part 2 and Part 3 of this planning proposal.

Note: At the time of writing Version 1 of this planning proposal, the subject land at North Parramatta is currently identified within the preserved area referred to as 'Area A' on the Special Provisions Area Map under the Parramatta LEP 2023 (refer to Figure 4). However, the subject land at North Parramatta identified for change to Category B parking rates as part of this planning proposal will be removed from 'Area A' due to the finalisation of State Environmental Planning Policy Amendment (Church Street North Precinct) 2023 commencing on 1 July 2024 (refer to Figure 5). As such, it is unnecessary for this planning proposal to introduce amendments removing the subject land from 'Area A' of the Special Provisions Area Map.

Table 7 – Current and proposed maximum car parking rates for the subject land at North Parramatta (as identified as Category B north of Victoria Road in Figure 3)

Current control under Parramatta LEP 2023 (up to and including 30 June 2024) – refer to Figure 4	Multi dwelling housing with 1, 2 or 3 bedrooms and residential flat buildings The sum of the following— (a) 1 space for every dwelling, (b) 1 visitor space for every 5 dwellings *Note: Subject land falls within 'Area A', as identified on the Special Provisions Area Map, therefore clause 7.19 maximum car parking rates currently apply until 30 June 2024.*
Current control under Parramatta LEP 2023 (from 1 July 2024 onwards – due to the finalisation of *State Environmental Planning Policy Amendment (Church Street North Precinct) 2023* commencing on 1 July 2024) – refer to Figure 5	Residential flat buildings, dual occupancies and multi dwelling housing The sum of the following— 0.1 space for each studio dwelling 0.3 space for each dwelling containing 1 bedroom 0.7 space for each dwelling containing 2 bedrooms 1 space for each dwelling with 3 or more bedrooms *Note: Subject land will be removed from 'Area A' from 1 July 2024 via State Environmental Planning Policy Amendment (Church Street North Precinct) 2023, and therefore general car parking rates under clause 7.17 will apply. These rates are consistent with the Category A rates as proposed in the ITP.*
Proposed amendments (under this planning proposal) – refer to Figure 6	• Insert a new 'Land Use and Transport Integration Map' into Parramatta LEP 2023.

	• Identify the subject land at North Parramatta as Category B on the new Land Use and Transport Integration Map, with all remaining land to be identified as Category A, as shown in Figure 3 above. • Category A land on the Land Use and Transport Integration Map to retain their existing car parking rates, but the residential car parking rates for Category B land will change to those shown below. • Amend the table to clause 7.17 to show the existing car parking rates for "Residential flat buildings, dual occupancies and multi dwelling housing" will apply to land shown as 'Category A' on the Land Use and Transport Integration Map. Further, add a new Land Use type in the table for "Residential flat buildings, dual occupancies and multi dwelling housing – Category B land" (as shown on the Land Use and Transport Integration Map), with the following rates: *The sum of the following—* *Resident spaces:* *(a) 0.2 space for each studio dwelling* *(b) 0.4 space for each dwelling containing 1 bedroom* *(c) 0.8 space for each dwelling containing 2 bedrooms* *(d) 1.1 spaces for each dwelling with 3 or more bedrooms* *Visitor spaces (calculated cumulatively):* *(e) 0.167 space for each dwelling up to 30 dwellings* *(f) 0.1 space for each dwelling more than 30 and up to 70 dwellings* *(g) 0.05 space for each dwelling more than 70 dwellings* *Note: These rates are consistent with the Category B maximum car parking rates as proposed in the ITP.*

Figures 4, 5 and 6 below show in order the timeline of changes to the parking rates (as described in Table 7 above) as applicable to the Parramatta CBD Area.

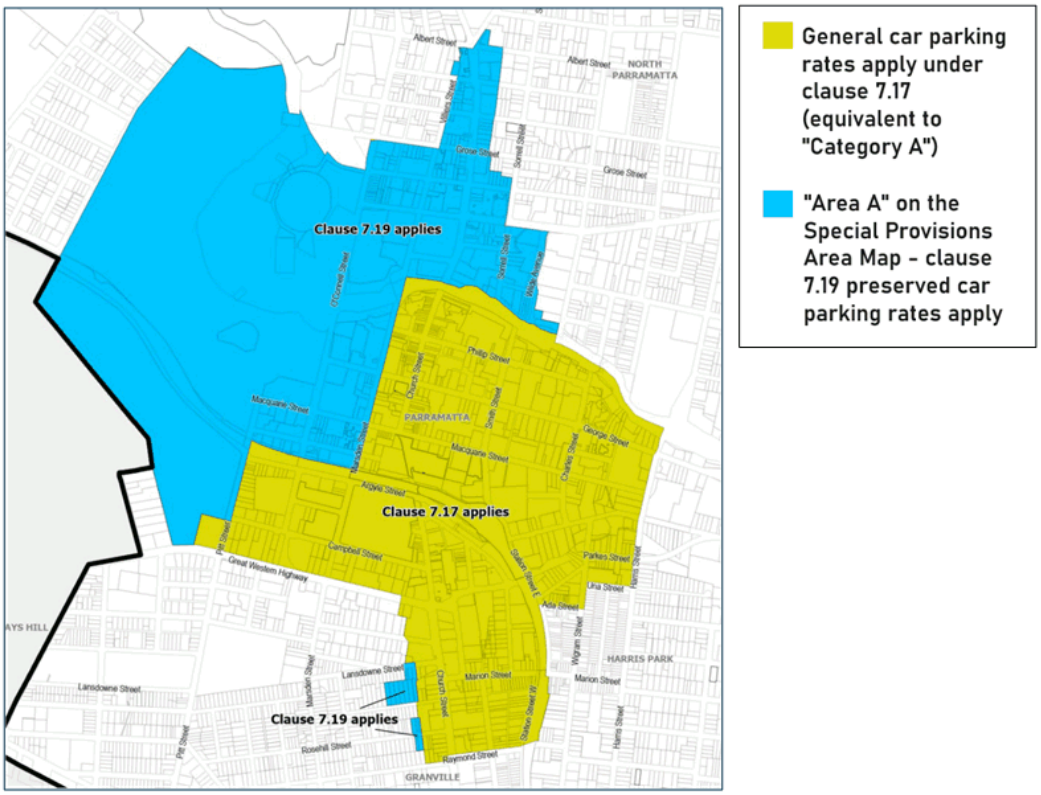


Figure 4 – Current Parking Rates (up to and including 30 June 2024)

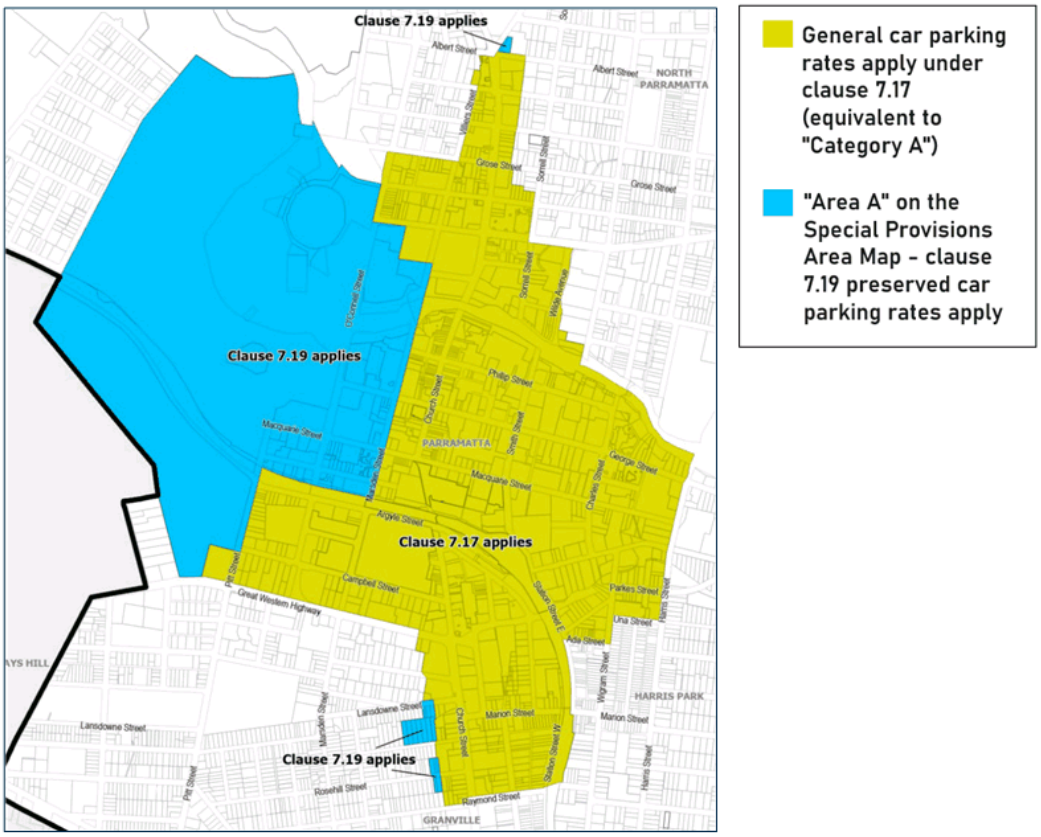


Figure 5 - Current Parking Rates (from 1 July 2024 onwards – due to the finalisation of State Environmental Planning Policy Amendment (Church Street North Precinct) 2023 commencing on 1 July 2024)

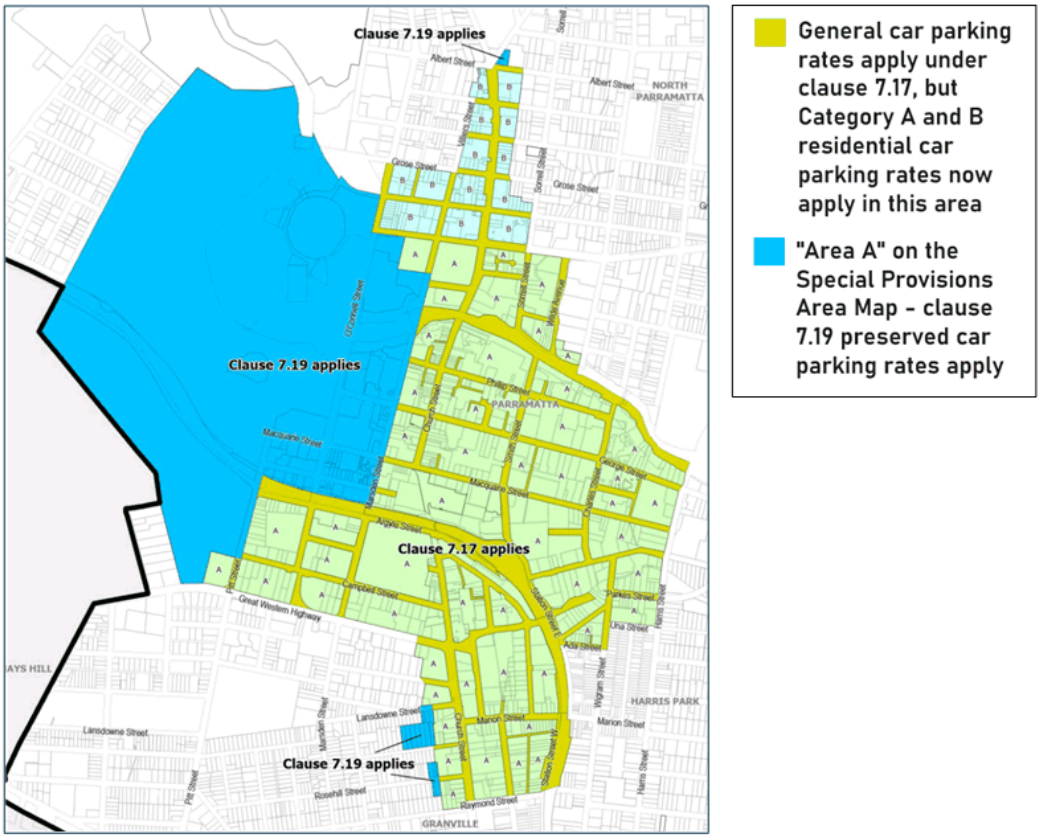


Figure 6 – Proposed amendments to parking rates (under this planning proposal)

PART 1 – OBJECTIVES OR INTENDED OUTCOMES

The objectives of the proposed amendments to *Parramatta Local Environmental Plan 2023* (PLEP 2023) under this planning proposal are:

1. To finalise outstanding matters remaining from the Parramatta CBD Planning Proposal (referred to as "Orange Matters").
2. To facilitate employment outcomes in the Parramatta CBD by securing and incentivising capacity for office development.
3. To improve transport and access outcomes by updating the network of laneways and road widenings, and also allowing for additional on-site car parking in North Parramatta.
4. To improve environmental outcomes in the Parramatta CBD by updating the BASIX exceedance targets for residential towers and enabling water recycling facilities.

PART 2 – EXPLANATION OF PROVISIONS

In order to achieve the desired objectives and outcomes detailed in Part 1, the following amendments to the Parramatta LEP 2023 (PLEP 2023) need to be made:

2.1 Land use rezoning

The planning proposal include amendments to rezone the Walker Corporation Landholdings at 10-12 Darcy Street, Parramatta (also known as 4 & 6 & 8 Parramatta Square) from MU1 Mixed Use zone to E2 Commercial Centre (refer to Figure 1).

The proposed rezoning will ensure a continuing supply of high-quality commercial floor space in a central location of the Parramatta CBD, close to heavy rail, metro rail and light rail. It is considered the current and future significant commercial uses on these sites align well with the objectives of the E2 Commercial Centre zone. The proposed changes will confirm the future economic vision for these lands and therefore attract more employment and business opportunities for the Parramatta CBD.

2.2 Built form controls

This planning proposal seeks no change to the existing height and FSR controls under the Height of Building (HOB) and Floor Space Ratio (FSR) maps of the Parramatta LEP 2023, however it proposes to apply clause 7.28 (Additional FSR for office premises) to the Walker Corporation landholdings at 10-12 Darcy Street, Parramatta (also known as 4 & 6 & 8 Parramatta Square), by extending the application of **Area B** under the **Special Provisions Area Map** to those sites. Clause 7.28, which applies to land identified as **Area B** on the **Special Provisions Area Map**, allows a building to exceed the maximum permissible FSR if the consent authority is satisfied the additional GFA will be used only for office premises.

Detailed current and proposed maps are available at Part 4 Maps of this planning proposal.

2.3 Land reservation acquisition map amendments

The planning proposal seeks to amend the Land Reservation Acquisition (LRA) map for the following existing or proposed laneways, splay corners and road widenings:

a. **Remove** the LRA notation at 328 Church Street, Paramatta (proposed laneway);
b. **Remove** the entire Marsden Laneway LRA notation, being part of 215 Church Street, Parramatta;
c. **Remove** part of Fire Horse Lane LRA, being part of 3 Fitzwilliam Street, and 25 Wentworth Street, Parramatta;
d. **New addition** of a 3m x 3m splay corner LRA on Woodhouse Lane, being part of 21 Wentworth Street, Parramatta;

e. **New addition** of an approx. 10m x 18m small splay corner on the north-east corner of Charles / Hassall Streets, being part of 2 Charles Street, Parramatta;
f. **Parkes Street widening,** being part of 24 Parkes Street, Harris Park.

Further details of above proposed amendments are available at Part 4 Maps of this planning proposal.

2.4 Additional provisions - sustainability

Additional land use permissibility

The planning proposal seeks an amendment to the Land Use Table of the Parramatta LEP 2023 to add 'water recycling facility' as a land use permitted with consent in the E2 Commercial Centre zone (Item 3), which only applies to the Parramatta CBD area. The proposed amendment is shown in red below:

Zone E2 Commercial Centre

3 Permitted with consent

Amusement centres; Artisan food and drink industries; Backpackers' accommodation; Building identification signs; Business identification signs; Car parks; Centre-based child care facilities; Commercial premises; Community facilities; Educational establishments; Entertainment facilities; Function centres; Home businesses; Home industries; Home occupations; Hospitals; Hotel or motel accommodation; Information and education facilities; Local distribution premises; Medical centres; Mortuaries; Oyster aquaculture; Passenger transport facilities; Places of public worship; Public administration buildings; Recreation areas; Recreation facilities (indoor); Recreation facilities (outdoor); Registered clubs; Respite day care centres; Restricted premises; Roads; Tank-based aquaculture; Tourist and visitor accommodation; Vehicle repair stations; Veterinary hospitals; Water recycling facilities

High Performing Building Design

This proposal seeks to amend the table to Clause 7.25(3)(c)(ii) by updating the BASIX Energy exceedance targets as follows:

(3)(c)(ii) the applicable BASIX target for energy by at least the amount of points specified for the building in the following table, or equivalent—

Height of building	***Building with FSR ranging from 6:1 to 16:1 BASIX points***
5-15 storeys	***25***
16-30 storeys	***20***
31-40 storeys	***15***
41 or more storeys	***15***

2.5 Maximum Residential car parking rate for certain land at North Parramatta (being part of the Parramatta CBD north of Victoria Road)

This planning proposal proposes amendments to Parramatta LEP 2023 to include new residential car parking rates for certain land within North Parramatta (outlined above as Category B north of Victoria Road in Figure 3). The proposal seeks to achieve this by:

a. Inserting a new Land Use and Transport Integration Map into the Parramatta LEP 2023, which will identify two categories for parking rates, being Category A and Category B (refer to Figure 3).
b. Identifying certain land at North Parramatta as Category B on the Land Use and Transport Integration Map, with all remaining land in the Parramatta City Centre (except the preserved area identified as 'Area A' on Special Provisions Area Map) to be identified as Category A, as shown in Figure 3.
c. Amending the table to clause 7.17 (Car parking – general) as shown below in red:

Land Use	Maximum number of car parking spaces
Residential flat buildings, dual occupancies and multi dwelling housing for land identified as Category A on the Land Use and Transport Integration Map	The sum of the following— (a) 0.1 space for each studio dwelling, (b) 0.3 space for each dwelling containing 1 bedroom, (c) 0.7 space for each dwelling containing 2 bedrooms, (d) 1 space for each dwelling with 3 or more bedrooms
Residential flat buildings, dual occupancies and multi dwelling housing for land identified as Category B on the Land Use and Transport Integration Map	The sum of the following— Resident spaces: (a) 0.2 space for each studio dwelling, (b) 0.4 space for each dwelling containing 1 bedroom, (c) 0.8 space for each dwelling containing 2 bedrooms, (d) 1.1 spaces for each dwelling with 3 or more bedrooms, Visitor spaces (calculated cumulatively): (e) 0.167 space for each dwelling up to 30 dwellings, (f) 0.1 space for each dwelling more than 30 and up to 70 dwellings, (g) 0.05 space for each dwelling more than 70 dwellings

PART 3 – JUSTIFICATION

This part describes the reasons for the proposed outcomes and development standards in the planning proposal.

3.1 Section A - Need for the planning proposal

This section establishes the need for a planning proposal in achieving the key outcomes and objectives. The set questions address the strategic origins of the proposal and whether amending the LEP is the best mechanism to achieve the aims on the proposal.

3.1.1 Is the planning proposal a result of an endorsed local strategic planning statement, strategic study or report?

This planning proposal is predominantly a result of a Council endorsed position on submissions received during the exhibition of the Parramatta CBD Planning Proposal in June 2021, as detailed in the 'Introduction' section of this planning proposal. Following the Council resolution, Council officers have further investigated the list of matters requiring further investigation, referred to as 'orange matters', and resolved to progress some matters to amend the Parramatta LEP, which have been included as part of this planning proposal. The Parramatta CBD Planning Proposal was supported by a number of technical studies and plans, some of which have been referenced in this supplementary planning proposal as supporting documents, including the:

- Parramatta CBD Integrated Transport Plan (Appendix 4),
- Update of Parramatta Floodplain Risk Management Plans (Appendix 5), and
- Achieving A-Grade Office Space in the Parramatta CBD Economic Review (Appendix 2).

Further, a Parramatta CBD High Performance Building Study Review (Appendix 3) has also been prepared in support of this planning proposal in relation to the proposed updates to the BASIX exceedance targets.

3.1.2 Is the Planning Proposal the best means of achieving the objectives or intended outcomes, or is there a better way?

As the planning proposal proposes amendments to zoning, FSR controls, LEP parking controls, LEP BASIX exceedance targets, LRA Amendments, and adding a permissible use to the E2 Commercial Centre zone, a planning proposal is the only and most effective way of delivering these changes. A planning proposal will provide certainty for Council, the local community, developers and landowners to allow for the orderly and economic development of the land in a transparent way.

3.2 Section B – Relationship to strategic planning framework

This section assesses the relevance of the planning proposal to the directions outlined in key strategic planning policy documents. Questions in this section

consider state and local government planning framework, including the NSW Government's *A Metropolis of Three Cities* and *Central City District Plan* (that informs the plans for the growth of the greater Sydney region), State Environmental Planning Policies, local strategic planning statements, community strategic plans and applicable Ministerial Directions.

3.2.1. Will the planning proposal give effect to the objectives and actions of the applicable regional, or district plan or strategy (including any exhibited draft plans or strategies)?

A Metropolis of Three Cities

In March 2018, the NSW Government released the *Greater Sydney Region Plan: A Metropolis of Three Cities* ("the GSRP"), being a 20 year plan which outlines a three-city vision for metropolitan Sydney to the year 2036.

The GSRP is structured under four themes: Infrastructure and Collaboration, Liveability, Productivity and Sustainability. Within these themes are 10 directions that each contains Potential Indicators and, generally, a suite of objective/s supported by a Strategy or Strategies. Those objectives and/or strategies relevant to this planning proposal are discussed below.

Liveability

An assessment of the planning proposal's consistency with the GSRP's relevant Liveability objectives is provided in Table 8, below.

Table 8 – Consistency of planning proposal with relevant Directions of Liveability

Liveability Direction	Relevant Objective	Comment
Housing the city	**O10**: Greater housing supply	While the planning proposal seeks to rezone the Walker Corporation landholdings at 10-12 Darcy Street, Parramatta (also known as 4 & 6 & 8 Parramatta Square) from MU1 Mixed Use to E2 Commercial Centre, it is not considered the proposal will reduce the overall permissible residential density of land, given the build-to-rent housing, a form of residential development, is permissible in both the
	O11: Housing is more diverse and affordable	

		MU1 and E2 zone under the Housing SEPP. In addition, the Walker Corporation landholdings are already subject to significant commercial office tower development which was only recently completed and therefore unlikely to be utilised for residential development despite the current MU1 zoning. The existing office tower development better aligns with the proposed E2 zone and expansion of the commercial core is also supported by the A-Grade Office Space in the Parramatta CBD Economic Review (Urbis 2019). As such, the planning proposal is consistent with this direction.
A city of great places	**O13:** Environmental heritage is identified, conserved and enhanced	The planning proposal seeks no changes to the heritage framework for the Parramatta CBD and any potential impacts on existing heritage items or HCAs are likely to be considered minimal or negligible. The proposed extension of the application of Area B of the Special Provisions Area Map to the rezoned Walker Corporation land at Parramatta Square so that clause 7.28

		(Additional FSR for office premises) applies is unlikely to have any significant heritage impact as heights are not changing and this land has only recently been developed with significant office tower development. As such, the proposal is consistent with this direction.

Productivity

An assessment of the planning proposal's consistency with the GSRP's relevant Productivity objectives is provided in Table 9, below.

Table 9 – Consistency of planning proposal with relevant directions of Productivity

Productivity Direction	Relevant Objective	Comment
A well connected city	**O14:** A Metropolis of Three Cities – integrated land use and transport creates walkable and 30-minute cities	The planning proposal will secure and incentivise the provision of office development in the Parramatta City Centre, which will facilitate more jobs close to the public transport network, including heavy rail, light rail, metro and buses, and also access to cycling and walking. The increase of E2 Commercial Centre zoned land at 4 & 6 & 8 Parramatta Square and incorporation of relevant office floor space incentive provisions as included in this planning proposal, will contribute to the

		achievement of metropolitan planning goals of providing jobs closer to home for the growing population of Western Sydney and the expansion of Sydney's Global Economic Corridor. As such, the planning proposal is consistent with this direction.
Jobs and skills for the city	**O19**: Greater Parramatta is stronger and better connected	The planning proposal will secure and incentivise the delivery of office floorspace and employment, which will further strengthen Parramatta's role as Greater Sydney's Central City. The planning proposal will secure a sustainable growth of new job opportunities for Western Sydney catchment by rezoning lands adjacent to the Parramatta rail station from MU1 Mixed Use to E2 Commercial Centre (i.e. the Walker Corporation landholdings site at 10-12 Darcy Street, Parramatta (also known as 4 & 6 & 8 Parramatta Square)) to contribute to the efforts of building the City as a centre of high employment and a driving force behind the future prosperity for the City of Parramatta. As such, the planning proposal is consistent with this direction.
	O22: Investment and business activity in centres	The planning proposal seeks to expand the commercial core by rezoning lands from

		MU1 to E2 Commercial Centre (i.e. Walker Corporation landholdings at Parramatta Square) to secure and incentivise capacity for longer term employment and business growth for the Parramatta City Centre and Central City District. As such, the planning proposal is consistent with this direction.

Sustainability

An assessment of the planning proposal's consistency with the GSRP's relevant Sustainability objectives is provided in Table 10, below.

Table 10 – Consistency of planning proposal with relevant directions of Sustainability

Sustainability Direction	Relevant Objective	Comment
An efficient city	**O33**: A low-carbon city contributes to net-zero emissions by 2050 and mitigates climate change. **O34:** Energy and water flows are captured, used and re-used	The planning proposal includes amendments to Clause 7.25 (High performing building design) to continue incentivising high-quality building design in the city centre. This would encourage building design for efficient energy consumption and contribute to the net-zero emission targets and mitigate climate change. The proposal also proposes to include new land use permissibility of 'water recycling facility' under the E2 Commercial Centre zone. This is to allow flexible water management solutions for future

		development and encourage efficient water usage, which would mitigate the climate change and contribute to the net-zero emissions. As such, the planning proposal is consistent with this direction.
A resilient city	**O37**: Exposure to natural and urban hazards is reduced	Most land within Parramatta CBD is flood affected. Developments within the Parramatta City Centre are regulated under Clause 7.11 Floodplain Risk Management under the Parramatta LEP 2023 and other relevant flooding risk management plans and policies. The planning proposal is a continuity of the Parramatta CBD Planning Proposal and is consistent with relevant policy framework for the Parramatta CBD area, including Clause 7.11 (Floodplain Risk Management) of Parramatta LEP 2023 and the Update of Parramatta Floodplain Risk Management Plans (Molino Stewart 2021) (refer to copy at Appendix 5), which was prepared to support the Parramatta CBD Planning Proposal. This planning proposal does not seek amendments to any flooding controls applicable to the Parramatta City Centre. The proposed increase in density envisaged under this planning proposal is generally consistent with that proposed under the Parramatta CBD Planning

		Proposal, and therefore continued application of Clause 7.11 (Floodplain risk management) is considered appropriate to address any flooding risks. Detailed flooding assessment will be undertaken at development application stage complying with the relevant flood risk management plan and policies (including relevant LEP and DCP controls). As such, the planning proposal is consistent with this direction.

Implementation

An assessment of the planning proposal's consistency with the GSRP's relevant Implementation objectives is provided in Table 11, below.

Table 11 – Consistency of planning proposal with relevant directions of Implementation

Implementation Direction	Relevant Objective	Comment
Implementation	**O39**: A collaborative approach to city planning	This planning proposal aims to promote orderly development that aligns with local, district and regional planning frameworks. The planning proposal will ensure a collaborative approach to city planning is achieved through consultation with relevant state agencies and the Department of Planning, Housing and Infrastructure. Additionally, the planning proposal will be placed on public exhibition for community consultation and feedback. The planning proposal supports the objectives of

		Parramatta's Community Engagement Strategy. This strategy is consistent with the Greater Sydney Region Plan and outlines a collaborative approach with the community throughout planning, design, development and management. As such, the planning proposal is consistent with this direction.

Central City District Plan

In March 2018, the NSW Government released the *Central City District Plan*, which outlines a 20-year plan for the Central City District, which comprises The Hills, Blacktown, Cumberland and City of Parramatta local government areas.

Taking its lead from the GSRP, the *Central City District Plan* ("CCDP") is also structured under four themes relating to Infrastructure and Collaboration, Liveability, Productivity and Sustainability. Within these themes are Planning Priorities that are each supported by corresponding Actions. Those Planning Priorities and Actions relevant to this planning proposal are discussed below.

Infrastructure and Collaboration

An assessment of the planning proposal's consistency with the CCDP's relevant Infrastructure and Collaboration Priorities and Actions is provided in Table 12 below:

Table 12 – Consistency of planning proposal with relevant CCDP Actions – Infrastructure and Collaboration

Infrastructure and Collaboration Direction	Planning Priority/Action	Comment
A city supported by infrastructure **O1:** Infrastructure supports the three cities **O2:** Infrastructure aligns with forecast growth – growth infrastructure compact	**PP C1: Planning for a city supported by infrastructure** • **A1:** Prioritise infrastructure investments to support the vision of *A Metropolis of Three Cities*	This planning proposal is a continuity of Parramatta CBD Planning Proposal and is consistent with the planning policy framework including the existing and planned infrastructure capacity for the CBD area.

O3: Infrastructure adapts to meet future need **O4:** Infrastructure use is optimised	• **A2:** Sequence growth across the three cities to promote north-south and east-west connections • **A3**: Align forecast growth with infrastructure • **A4:** Sequence infrastructure provision using a place based approach • **A5**: Consider the adaptability of infrastructure and its potential shared use when preparing infrastructure strategies and plans • **A6**: Maximise the utility of existing infrastructure assets and consider strategies to influence behaviour changes to reduce the demand for new infrastructure, supporting the development of adaptive and flexible regulations to allow decentralised utilities	The planning proposal includes changes that address some outstanding matters arising from the exhibition of the Parramatta CBD Planning Proposal and will not generate significant additional growth in the CBD area beyond that envisaged in the Parramatta CBD Planning Proposal, instead it seeks to align some existing commercial uses to the suitable zone and secure and incentivise capacity for jobs that is close to existing infrastructure. This proposal will promote a dynamic and diverse Parramatta City Centre and optimise the use of current and planned local and state infrastructure. The planning proposal also establishes two categories for car parking rates, consistent with the Parramatta CBD Integrated Transport Plan. Category A, which is located closer to the metro and heavy rail stations, will retain the current more restrictive car parking rates, whereas Category B land, which is located in North Parramatta further away from this public transport infrastructure, will have less restrictive rates. This will ensure

		optimised use of this public transport infrastructure. As such, the planning proposal is consistent with this direction.

Liveability

An assessment of the planning proposal's consistency with the CCDP's relevant Liveability Priorities and Actions is provided in Table 13, below.

Table 13 – Consistency of planning proposal with relevant CCDP Actions – Liveability

Liveability Direction	Planning Priority/Action	Comment
Housing the city **O10**: Greater housing supply **O11:** Housing is more diverse and affordable	**PP C5: Providing housing supply, choice and affordability, with access to jobs, services and public transport**	*Refer to the response against the GSRP above, O10 and O11 in Table 8.*
A city of great places **O13:** Environmental heritage is identified, conserved and enhanced	**PP C6: Creating and renewing great places and local centres, and respecting the District's heritage** • **A19**: Identify, conserve and enhance environmental heritage	*Refer to the response against the GSRP above, O13 in Table 8.*

Productivity

An assessment of the planning proposal's consistency with the CCDP's relevant Productivity Priorities and Actions is provided in Table 14, below.

Table 14 – Consistency of planning proposal with relevant CCDP Actions – Productivity

Productivity Direction	Planning Priority/Action	Comment
A well-connected city **O19**: Greater Parramatta is stronger and better connected	**PP C7: Growing a stronger and more competitive Greater Parramatta** • **A23:** Strengthen the economic	*Refer to the response against the GSRP above, O19 in Table 9.*

	competitiveness of Greater Parramatta and grow its vibrancy	
O14: The plan integrates land use and transport creates walkable and 30 minute cities	**PP C9: Delivering integrated land use and transport planning and a 30-minute city** • **A32**: Integrate land use and transport plans to deliver a 30-muinute city • **A33**: Investigate, plan and protect future transport and infrastructure corridors • **A34**: Support innovative approaches to the operation of business, educational and institutional establishments to improve the performance of the transport network	*Refer to the response against the GSRP above, O14 in Table 9.* The planning proposal makes a number of updates to the Land Reservation Acquisition Map, so as to ensure alignment with latest transport corridor planning. The planning proposal also establishes two categories for car parking rates, consistent with the Parramatta CBD Integrated Transport Plan. Category A, which is located closer to the metro and heavy rail stations, will retain the current more restrictive car parking rates, whereas Category B land, which is located in North Parramatta further away from this public transport infrastructure, will have less restrictive rates. This will ensure optimised use of this public transport infrastructure. Expanding the E2 Commercial Centre zone close to the heavy rail and metro stations will enable increased business

		opportunities and more workers close to public transport. As such, the planning proposal is consistent with this direction.

Sustainability

An assessment of the planning proposal's consistency with the CCDP's relevant Sustainability Priorities and Actions is provided in Table 15, below.

Table 15 – Consistency of planning proposal with relevant CCDP Actions – Sustainability

Sustainability Direction	Planning Priority/Action	Comment
An efficient city **O33**: A low-carbon city contributes to net-zero emissions by 2050 and mitigates climate change O34: Energy and water flows are captured, used and re-used	**PP C19: Reducing carbon emissions and managing energy, water and waste efficiently** • **A75**: Support initiatives that contribute to the aspirational objectives of achieving net-zero • **A79**: Encourage the preparation of low-carbon, high efficiency strategies to reduce emissions, optimise the use of water, reduce waste and optimise car parking provision where an increase in total floor area greater than 100,000 square metres is proposed in any contiguous area of 10 or more hectares	*Refer to the response against the GSRP above, O33 and O34 in Table 10.*
O36: People and places adapt to climate change and future shocks and stresses **O37**: Exposure to natural and urban hazards is reduced	**PP C20: Adapting to the impacts of urban and natural hazards and climate change** • **A85**: Consider strategies and measures to manage flash flooding and safe evacuation when planning for	*Refer to the response against the GSRP above, O37 in Table 10.*

	growth in Parramatta CBD	

3.2.2. Is the planning proposal consistent with a council LSPS that has been endorsed by the Planning Secretary or (the former) GCC, or another endorsed local strategy or strategic plan?

The following local strategic planning documents are relevant to the planning proposal.

Parramatta CBD Planning Strategy

Council adopted the "Parramatta CBD Planning Strategy" at its meeting of 27 April 2015. The Strategy is the outcome of detailed technical studies which reviewed the current planning framework and also a significant program of consultation with stakeholders and the community. The Parramatta CBD Planning Strategy informed the Parramatta CBD Planning Proposal (Amendment 56 to the Parramatta LEP 2011).

The objectives of the Strategy are as follows:

- To set the vision for the growth of the Parramatta CBD as Australia's next great city;
- To establish principles and actions to guide a new planning framework for the Parramatta CBD; and
- To provide a clear implementation plan for delivery of the new planning framework for the Parramatta CBD.

This planning proposal is considered to be consistent with the objectives and vision of the Strategy. This is because in effect it is a continuity of the Parramatta CBD Planning Proposal and addresses some outstanding planning matters in the CBD area arising from the exhibition of the Parramatta CBD Planning Proposal. This planning proposal will continue to support the planned growth for the Parramatta CBD as the heart of the Central City for Greater Sydney, maximising the CBD's commercial core to generate jobs and business opportunities for the growing community of Western Sydney.

Community Strategic Plan 2018-2038 (City of Parramatta)

Council's Community Strategic Plan 2018-2038 (CSP) identifies the City's priorities and aspirations and provides a clear set of strategies to guide policies and decision making for the next 20 years. The plan formalises several big and transformational ideas for the City and the region, including the following:

- the development of Parramatta CBD, Westmead, Camellia and Rydalmere;
- a Light Rail network and Local and Regional Ring Roads;
- the Parramatta River entertainment precinct; and
- a connected series of parks and recreation spaces.

This planning proposal is considered to meet the strategies and key objectives identified in the CSP. It proposes to expand the E2 Commercial Centre zone, which will support job and business growth in the Parramatta City Centre. A copy of the CSP can be accessed via:

https://www.cityofparramatta.nsw.gov.au/council/key-council-documents/community-strategic-plan

Parramatta Local Strategic Planning Statement

The City of Parramatta's Local Strategic Planning Statement (LSPS) "City Plan 2036" came into effect on 31 March 2020. The LSPS sets a 20-year land use planning vision for the City. It balances the need for housing and economic growth, while also protecting and enhancing housing diversity, heritage, local character and the City's environmental assets, as well as improving the health and liveability of the City.

This planning proposal meets the planning priorities and policy directions in the LSPS. The LSPS concentrates job growth within the City's Strategic Centres and the Greater Parramatta Metropolitan Centre (including the Parramatta CBD) where employees can access major transport infrastructure and other high-level facilities, amenities and services. The expansion of the E2 Commercial Centre zone as proposed under this planning proposal will help to focus jobs and business growth in the Parramatta CBD, consistent with the LSPS.

The planning proposal also proposes to enhance liveability and connectivity in the Parramatta City Centre via amending residential car parking rate provision for certain land at North Parramatta (based on access to public transport), and also updating the high performing building design standards to improve environmental outcomes.

As such, the planning proposal is considered to be consistent with the LSPS, in particular the following key planning priorities as detailed in Table 16 below.

Table 16 – Consistency of Planning Proposal with key LSPS planning priorities

LSPS Planning Priority	Planning Proposal mechanism
Planning Priority 1 - Expand Parramatta's economic role as the Central City of Greater Sydney *Planning Priority 11* - Build the capacity of the Parramatta CBD, Strategic Centres, Local Centres and Employment Lands to be strong, competitive and productive	• Expansion of E2 Commercial Centre zone. • Expansion of land where clause 7.28 (Additional floor space ratio for office premises) applies.

Planning Priority 10 - Improve active walking and cycling infrastructure and access to public and shared transport	• Land Reservation Acquisition Map amendments. • Changes to parking controls to introduce Category A and B rates based on transport access.
Planning Priority 15 - Reduce emissions and manage energy, water, and waste efficiently to create better buildings and precincts and solve city planning challenges	• Updating of BASIX exceedance targets for high performing buildings as applicable to residential development. • Making water recycling facilities permissible with consent in the E2 Commercial Centre zone.

A copy of the LSPS as endorsed by Council and assured by the Greater Sydney Commission (as it was then known) in March 2020 can be accessed via:

https://www.cityofparramatta.nsw.gov.au/lsps

1.2.3 Is the planning proposal consistent with any other applicable state and regional studies or strategies?

This planning proposal is consistent with the State and Regional strategic planning framework as below.

A City Supported by Infrastructure – A Place-based Infrastructure Compact (PIC) Pilot

The former Greater Sydney Commission (GSC) prepared the 'A City Supported by Infrastructure – A Place-based Infrastructure Compact' (PIC) Pilot for the Greater Parramatta and Olympic Peninsula (GPOP) area. The GPOP PIC was exhibited by the GSC from 7 November to 18 December 2019 who then released their final recommendations on the GPOP PIC to the NSW Government.

The GPOP PIC is a strategic planning model that seeks to better align growth of jobs and housing with the provision of infrastructure and services centred around transport, housing diversity, job creation and amenity. The PIC outlines GPOP's role as a major generator of new jobs and housing and identifies the requirement for sequencing of growth and supporting infrastructure projects in a logical way to ensure that the area becomes more liveable, productive and sustainable as it grows.

The planning proposal is consistent with the GPOP PIC vision as it aims to strengthen and support the Parramatta CBD's role in the GPOP corridor as a connected and competitive CBD for the Greater Sydney region. It proposes to secure and incentivise office floorspace in a key location in the Parramatta CBD (ie. at Parramatta Square) that is well serviced by local and state infrastructure.

1.2.4 Is the planning proposal consistent with applicable SEPPs?

The following State Environmental Planning Policies (SEPPs) are of relevance

to this planning proposal (refer to Table 17 below).

Table 17 – Consistency of planning proposal with relevant SEPPs

State Environmental Planning Policies (SEPPs)	Consistency: Yes = ✓ No = x N/A = Not applicable	Comment
SEPP (Biodiversity and Conservation) 2021	✓	Consistent. The planning proposal is only considering land that is within the Parramatta CBD. It is mainly developed urban land and does not have any significant biodiversity value. The planning proposal does not contain any provisions that contradict or would hinder the application of the SEPP.
SEPP (Exempt and Complying Development Codes) 2008	✓	Consistent. The planning proposal does not contain any provisions that contradict or would hinder the application of the SEPP.
SEPP (Housing) 2021	✓	Consistent. The planning proposal is consistent with the principles of the Housing SEPP to encourage housing diversity including 'built-to-rent' housing. While the planning proposal seeks to rezone the Walker Corporation landholdings at 10-12 Darcy Street, Parramatta (also known as 4 & 6 & 8 Parramatta Square) from MU1 Mixed Use to E2 Commercial Centre, it is noted that the SEPP allows **'build-to-rent housing**' in **both** the **MU1 and E2 zones.**

		In addition, the Walker Corporation landholdings are already subject to significant commercial office tower development, which was only recently completed and therefore is unlikely to be utilised for residential development, despite the current MU1 zoning. As such, the planning proposal does not contain any provisions that contradict or would hinder the application of the SEPP.
SEPP (Industry and Employment) 2021	✓	Consistent. The planning proposal would enable provision of jobs within the Parramatta CBD. The planning proposal does not contain any provisions that contradict or would hinder the application of the SEPP.
SEPP (Planning Systems) 2021	✓	Consistent. The planning proposal does not contain any provisions that contradict or would hinder the application of the SEPP.
SEPP (Precincts – Central River City) 2021	✓	Consistent. The planning proposal does not contain any provisions that contradict or would hinder the application of the SEPP.
SEPP (Sustainable Buildings) 2022	✓	Consistent. The planning proposal updates the BASIX exceedance targets for residential development in the Parramatta CBD and also introduces 'water recycling facilities' as a permissible land use in the E2 Commercial Centre zone. These measures will encourage more sustainable building design and are generally consistent with this SEPP.

		The planning proposal does not contain any provisions that contradict or would hinder the application of the SEPP.
SEPP (Transport and Infrastructure) 2021	✓	Consistent. The planning proposal does not contain any provision that contradict or would hinder the application of the SEPP.

1.2.5 Is the planning proposal consistent with applicable Ministerial Directions (s.9.1 directions) or key government priority?

In accordance with Clause 9.1 of the *EP&A Act 1979* the Minister issues directions for relevant planning authorities to follow when preparing planning proposals for new LEPs. The directions are listed under nine focus areas:

1. Planning Systems and Planning Systems – Place Based
2. Design and Place
3. Biodiversity and Conservation
4. Resilience and Hazards
5. Transport and Infrastructure
6. Housing
7. Industry and Employment
8. Resources and Energy
9. Primary Production

The following directions are considered relevant to the subject planning proposal.

Table 18 – Consistency of planning proposal with relevant Section 9.1 Directions

Relevant Direction	Comment	Compliance
1. Planning Systems and Planning Systems – Place Based		
Direction 1.1 – Implementation of Regional Plans The objective of this direction is to give legal effect to the vision, land use strategy, goals, directions and actions contained in Regional Plans.	The planning proposal applies to land within the Parramatta City Centre that is located at the heart of Greater Sydney's Central City. The planning proposal is consistent with the goals, directions and actions contained in the Greater Sydney Region Plan 'A Metropolis of Three Cities', as outlined above in Table 8, Table 9, Table 10 and Table 11.	Yes
Direction 1.3 – Approval and Referral Requirements	The planning proposal does not contain provisions requiring concurrence, consultation or referral of a Minister or public authority, nor does	Yes

The objective of this direction is to ensure that LEP provisions encourage the efficient and appropriate assessment of development.	it identify development as designated development.	
Direction 1.4 – Site Specific Provisions The objective of this direction is to discourage unnecessarily restrictive site-specific planning controls.	The planning proposal does not allow a particular development to carried out on a specific site via a site-specific clause.	Yes
Direction 1.7 – Implementation of Greater Parramatta Priority Growth Area Interim Land Use and Infrastructure Implementation Plan The objective of this direction is to ensure development within the Greater Parramatta Priority Growth Area is consistent with the Greater Parramatta Priority Growth Area Interim Land Use and Infrastructure Implementation Plan dated July 2017 (the Interim Plan)	The planning proposal achieves the overall intent of the Plan and does not undermine the achievement of its objectives, planning principles and priorities for the Greater Parramatta Priority Growth Area. The planning proposal aims to support the commercial focus of Parramatta CBD as a key employment and business centre for the growing community of Western Sydney.	Yes
3 Biodiversity and Conservation		
Direction 3.2 – Heritage Conservation The objective of this direction is to protect and conserve environmentally sensitive areas.	The planning proposal seeks no changes to the heritage framework for the Parramatta CBD and any potential impacts on existing heritage items or HCAs are likely to be considered minimal or negligible. The proposed extension of the application of Area B of the Special Provisions Area Map to the proposed	Yes

	rezoned Walker Corporations land at 10-12 Darcy Street, Parramatta (also known as 4 & 6 & 8 Parramatta Square) so that clause 7.28 (Additional FSR for office premises) applies is unlikely to have any significant heritage impact as heights are not changing and this land has only recently been developed with significant office tower development.	
4 Resilience and Hazards		
Direction 4.1 – Flooding The objectives of this direction are to: (a) Ensure that development of flood prone land is consistent with the NSW Government's Flood Prone Land Policy and the principles of the Floodplain Development Manual 2005, and (b) Ensure that the provisions of an LEP that apply to flood prone land are commensurate with flood behaviour and includes consideration of the potential flood impacts both on and off the subject land.	Most land within Parramatta CBD is flood affected. Developments within the Parramatta City Centre are regulated under Clause 7.11 Floodplain Risk Management under the Parramatta LEP 2023 and other relevant flooding risk management plans and policies. The planning proposal is a continuity of the Parramatta CBD Planning Proposal and is consistent with relevant policy framework for the Parramatta CBD area, including Clause 7.11 (Floodplain Risk Management) of Parramatta LEP 2023 and the Update of Parramatta Floodplain Risk Management Plans (Molino Stewart 2021) (refer to copy at Appendix 5), which was prepared to support the Parramatta CBD Planning Proposal. This planning proposal does not seek amendments to any flooding controls applicable to the Parramatta City Centre. The only site under this planning proposal that envisages some form of increased development density, which is affected by flooding up to the PMF*, is the Walker Corporation land holdings at 10-12 Darcy Street,	No. However the planning proposal is in accordance with the Council adopted Update of Parramatta Floodplain Risk Management Plans (Molino Stewart 2021) (refer to copy at Appendix 5).

	Parramatta (also known as 4 & 6 & 8 Parramatta Square). **N.B. – Council has prepared a new draft flood model which has been publicly exhibited. The flood level affectation of these sites may potentially change once the new model has been formally adopted.* The planning proposal seeks to apply clause 7.28 (additional office floorspace) to the Walker Corporation landholdings to allow additional floorspace for office premises only, subject to conditions. The proposed increase in density envisaged under this planning proposal is considered to be generally consistent with the overall increase in density proposed under the Parramatta CBD Planning Proposal for the CBD area, and therefore continued application of Clause 7.11 (Floodplain risk management) is considered appropriate to address any flooding risks. This Ministerial Direction does not allow a planning proposal to permit a significant increase in development density for land in the flood planning area. However, a planning proposal may be inconsistent with the direction if the planning proposal is in accordance with a floodplain risk management plan adopted by the Council. As this planning proposal is in effect a continuity of the Parramatta CBD Planning Proposal, and the proposed increase in density is considered to be generally consistent with the Parramatta CBD Planning Proposal, this planning proposal is considered to be in accordance with the Council adopted Update of Parramatta Floodplain Risk Management Plans (Molino Stewart 2021) (refer to copy at Appendix 5), which was prepared in support of the Parramatta CBD Planning Proposal.	

Direction 4.4 – Remediation of Contaminated Land The objective of this direction is to reduce the risk of harm to human health and the environment by ensuring that contamination and remediation are considered by planning proposal authorities.	The land is not within an investigation area within the meaning of the Contaminated Land Management Act 1997 and has not been subject to development as described in Table 1 of the contaminated land planning guidelines. As such, the planning proposal is consistent with this direction.	Yes
Direction 4.5 - Acid Sulfate Soils The objective of this direction is to avoid significant adverse environmental impacts from the use of land that has a probability of containing acid sulfate soils.	The planning proposal includes land identified as Class 4 and 5 on the Acid Sulfate Soils Map in Parramatta Local Environmental Plan 2023. Clause 6.1 (Acid sulfate soils) of the Parramatta LEP 2023 will continue to apply to this land. Any future development applications in this area will be subject to assessment under clause 6.1 (Acid sulfate soils). This planning proposal does not propose an intensification of land uses in terms of the proposed rezoning of certain land from MU1 Mixed Use to E2 Commercial Centre in the context of the Parramatta CBD area. As such, the planning proposal is consistent with this direction.	Yes
5 Transport and Infrastructure		
Direction 5.1 – Integrating Land Use and Transport The objective of this direction is to ensure that development reduces dependence on cars, increases the choice of available transport and improves access to housing, jobs and services by walking, cycling and public transport.	The planning proposal is consistent with this direction, in that it will secure and incentivise the provision of office premises in proximity to the existing Parramatta Transport Interchange, which will enable workers to utilise the rail and bus network to travel to and from work. The planning proposal also establishes a new categorisation for residential car parking rates. More restrictive maximum residential car parking rates will apply to Category A land, which is close to public transport, and less restrictive residential car parking rates	Yes

	will apply to Category B land, which is further away from public transport. This is consistent with the Parramatta CBD Integrated Transport Plan (ITP). As such, the planning proposal is consistent with this direction.	
Direction 5.2 – Reserving Land for Public Purposes The objectives of this direction are to facilitate the provision of public services and facilities by reserving land for public purposes and facilitate the removal of reservations where the land is no longer required for acquisition.	The planning proposal will amend the Land Reservation Acquisition (LRA) map for several laneways, splay corners and road widenings (existing and proposed) across the Parramatta CBD area. It proposes to remove the reserved laneways (including removal of LRA at 328 Church Street Parramatta) that are no longer required for acquisition due to changes in urban development and add new ones where needed to promote safe road connections for the general public. The proposed amendments are consistent with the Parramatta CBD Integrated Transport Plan and recent urban design analysis. As such, the planning proposal is consistent with this direction.	Yes
6 Housing		
Direction 6.1 – Residential Zones The objectives of this direction are to encourage a variety and choice of housing types, make efficient use of existing infrastructure and services and minimise the impact of residential development.	Whilst this planning proposal seeks to rezone some land from MU1 Mixed Use (which permits residential development) to E2 Commercial Centre (which prohibits residential development), it is not considered to reduce the overall permissible residential density of land, given that build-to-rent housing, a form of residential development, is still permissible in the E2 Commercial Centre zone under the Housing SEPP. Further to the above, the following is also considered relevant: • The land being rezoned, being the Walker Corporation landholdings at 10-12 Darcy Street, Parramatta (also known as 4 & 6 & 8	Yes

	Parramatta Square), is already subject to significant commercial office tower development, which was only recently completed and therefore unlikely to be utilised for residential development, despite the current MU1 Mixed Use zoning. This development better aligns with the proposed E2 Commercial Centre zoning. • The expansion of the commercial core is supported by a study, being the Achieving A-Grade Office Space in the Parramatta CBD Economic Review (Urbis 2019) (refer to copy at Appendix 2). As such, the planning proposal is consistent with this direction.	
7 Industry and Employment		
Direction 7.1 – Business and Industrial Zones The objectives of this direction are to: (a) Encourage employment growth in suitable locations, (b) Protect employment land in business and industrial zones; and (c) Support the viability of identified centres.	The planning proposal does not seek to reduce the total potential floor space area for employment uses in employment areas. The expansion of the E2 Commercial Centre zone, including expanding the application of clause 7.28 (Additional FSR for Office Premises), will facilitate and incentivise employment and business uses (and associated floor space) in the Parramatta City Centre area. It is also noted that the proposed expansion of the commercial core is supported by a study, being the Achieving A-Grade Office Space in the Parramatta CBD Economic Review (Urbis 2019) (refer to copy at Appendix 2) As such, the planning proposal is consistent with this direction.	Yes

1.3 Section C – Environmental, social and economic impact

This section considers the potential environmental, social and economic impacts which may result from the planning proposal.

3.3.1 Is there any likelihood that critical habitat or threatened species, populations or ecological communities, or their habitats, will be adversely affected because of the proposal?

No. The planning proposal applies to the sites that are within a highly urbanised environment, and it is unlikely to contain critical habitat or threated species, populations or ecological communities or their habitat. The sites are unlikely to impact on any threatened flora or fauna species or threatened species habitat.

3.3.2 Are there any other likely environmental effects of the planning proposal and how are they proposed to be managed?

The main potential environmental effects of this planning proposal can be summarised into the following key areas:

- Urban Design and Built Form
- Transport and Accessibility
- Sustainability and Environment

These are described in more detail below.

Urban Design and Built Form

Expansion of E2 Commercial Centre Zone and application of clause 7.28 (Additional FSR for office premises)

This planning proposal proposes the expansion of the E2 Commercial Centre zone over the Walker Corporation landholdings at 10-12 Darcy Street, Parramatta (also known as 4 & 6 & 8 Parramatta Square) (refer to Figure 1). Further, the planning proposal also proposes expanding the application of clause 7.28 (Additional FSR for office premises) over this land. Clause 7.28 allows development to exceed the maximum permissible FSR, but only if this is to be used for office premises. Further, in order to utilise clause 7.28, the site must have an area of at least 1,800sqm and a development control plan must be prepared which must provide for the following:

a) the compatibility of the proposed development with the desired future character of the area, having regard to the future vision and objectives of Parramatta City Centre,
b) the minimisation of detrimental impacts on significant view corridors, including George Street,
c) the suitability of the land for development,
d) heritage issues and streetscape constraints of the land,
e) the location of the development, having regard to the need to achieve an acceptable relationship with other buildings on the same site or on neighbouring sites in terms of separation, setbacks, outlook, orientation, amenity and urban form,
f) the bulk, massing and modulation of buildings,
g) street frontage heights,
h) environmental impacts, including sustainable design, overshadowing and solar access, visual and acoustic privacy, noise, wind and reflectivity,
i) the principles of ecologically sustainable development,
j) pedestrian and cycle requirements, including the permeability of pedestrian networks,
k) the impact on, and proposed improvements to, the public domain,
l) appropriate interfaces at ground level between the building and the public domain,

m) enabling deep soil for tree planting and vegetation where appropriate,
n) the appropriate segmenting of large podiums at ground level to provide through-site connections and green, open public space.

Expansion of the E2 Commercial Centre zone will allow for intensification of commercial and business uses on this land, which is centrally located close to the Parramatta Transport Interchange. The existing newly constructed commercial office towers at Parramatta Square are consistent with the proposed zoning. Expansion of the E2 Commercial Centre zone is also consistent with the recommendations of the Achieving A-Grade Office Space in the Parramatta CBD Economic Review (Urbis, 2019) (refer to Appendix 2).

Transport and Accessibility

Residential Parking Controls

The Parramatta CBD Integrated Transport Plan (ITP) adopted two categories of car parking rates for residential development – Category A and Category B. The allocation of categories is based on proximity to train stations in the Parramatta City Centre area. Category A includes locations which are:

- Within 800m or a 10-minute walk approximately from Parramatta train station
- Within 800m or a 10-minute walk approximately from the future Metro Station
- Within 400m or a 5-minute walk approximately from Harris Park train station (no express services)

Other locations at the CBD fringes considered remote from public transport are allocated Category B under the ITP. This planning proposal adopts the Category A and B residential parking policy framework for the Parramatta City Centre – refer to map at Figure 3 which shows the proposed Category A and B areas. Category A areas maintain the current more restrictive maximum parking rate applicable to residential dwellings that are close to train stations. By maintaining a more restrictive maximum parking supply for dwellings that are within a close walking distance of a train station, residents who live within the walking catchment would be able to get to the station by walking or cycling instead, thereby reducing the need to car usage. With the anticipated population and employment increases over time, it will become increasingly critical to reduce utilisation of private vehicles to lessen the impact on the road network and the need for large scale investment in road infrastructure.

Category B areas will permit a higher maximum rate of on-site parking for residential dwellings. This is due to their greater distance from the rail stations, necessitating the likely need for more residents to own a car for their daily needs. Under this planning proposal, the Category B areas have been identified in the northern part of the Parramatta City Centre, at land in North Parramatta located north of Victoria Road. This is land is located away from the train stations on the fringe of the CBD and is consistent with the recommendations of the ITP.

The proposed new Category A and B parking policy framework would serve as a driver to encourage greater shift towards sustainable and active transport modes and investment in infrastructure that would support and facilitate the use of these modes. This will provide environmental, access and amenity benefits, which will be critical to the success of the city going forward.

Proposed amendments to Land Reservation Acquisition Map

This planning proposal includes amendments to several laneways, splay corners and road widenings as outlined in Part 1. The proposed amendments are consistent with the Parramatta CBD Integrated Transport Plan (ITP) and also recent urban design analysis.

The ITP was undertaken to inform the Parramatta CBD Planning Proposal, setting out a required plan to support the increased growth of employment in the city. Following completion of the ITP, Council officers have further investigated the need to remove and add new Land Reservation Acquisition (LRA) notations for the Parramatta CBD area in line with the following strategic intents of the ITP:

- Strategic opportunities to improve capacity and capability of the existing road network, having regard to the significant growth within the Parramatta CBD as well as inherent existing constraints, such as heritage and existing significant development.
- Opportunities to improve public transport capability through localised intersection improvements and augmentation of existing bus lanes.
- Opportunities for a regional cycleway network within the Parramatta CBD.
- Opportunities to improve pedestrian safety and capacity.

The proposed changes are in response to recent developments and will improve safety, active transportation, better traffic circulation and movement throughout the Parramatta CBD. Table 19 outlines the proposed amendments to the Land Reservation Acquisition Map and relevant justification.

Table 19 – Proposed LRA amendments and justification

Proposed LRA Map Change	Justification
Full deletion of current LRA notation on 328 Church Street, Parramatta	Recent urban design analysis indicated that east-west pedestrian connections can be achieved in this location (between Church Street and Phillip Lane) through 2 thinner covered arcade or laneway connections, rather than through 1 wider 'open to sky' laneway connection, as currently proposed on the subject property. These can be implemented as a part of a future development proposal in this location in a DCP control, which will remove the significant financial burden that currently exists for Council if it were to acquire the site (which is estimated at approximately $5.28 million to $10.12 million).
Full deletion of current LRA notation that applies to Marsden Lane, being part of 215 Church Street Parramatta	The deletion is consistent with the strategic intent of the ITP. Removal of LRA is needed as it no longer serves any community purpose. The service lane is for access to private properties only, it is not required for use by the public and therefore there is no need for it to be acquired as a public laneway.

Partial removal of the Fire Horse Lane LRA, being part of 3 Fitzwilliam Street, and 25 Wentworth Street, Parramatta	The partial removal is consistent with the strategic intent of the ITP. The delivery of Fire Horse Lane as a shared zone has removed the need to widen along the extent of Fire Horse Lane, however the small portion at the bottom is still required to provide adequate width to convert the existing one-way section to two-way movement.
New addition of a 3m x 3m splay LRA on Woodhouse Lane, being part of 21 Wentworth Street, Parramatta	The addition is consistent with the strategic intent of the ITP. Addition of 3m x 3m LRA on the south-west of 21 Wentworth Street will improve convenience for turning vehicles, and also improve sight lines for oncoming traffic.
New addition of a small splay on Charles Street / Hassall Street intersection, being part of 2 Charles Street, Parramatta	The addition is consistent with the strategic intent of the ITP. The proposed new LRA on the south-west corner of 2 Charles Street will provide for better traffic circulation. This is to improve the view line of oncoming vehicles and facilitate better traffic circulation.
New addition of LRA for Parkes Street widening, being part of 24 Parkes Street, Harris Park	The addition is consistent with the strategic intent of the ITP. Extension of the existing LRA from 26-30 Parkes Street LRA tapering to 24 Parkes Street will widen the left turn lane and improve safety and convenience for tuning vehicles.

Sustainability and Environment

High Performing Building Design – BASIX Exceedance Targets

The planning proposal seeks to update the existing controls to encourage continuing sustainable building design across Parramatta CBD. Clause 7.25 of the Parramatta LEP 2023 incentivises higher sustainability in new residential and mixed-use developments through a floorspace bonus scheme. The incentive structure requires a set of BASIX exceedance targets linked to the height of the proposed building and FSR.

However, the BASIX system has been revised through the introduction and commencement of State Environmental Planning Policy (Sustainable Buildings) 2022 ('Sustainable Buildings SEPP') in October 2023. This includes revised compliance targets as well as BASIX calculator updates that incorporate policy, technology and industry trends. Table 20 shows the translation between BASIX Energy target under the older governance system and the updated BASIX Energy target under the

Sustainable Buildings SEPP that took effect from 1 October 2023. The updated BASIX energy target shows a significant increase for buildings ranging from low rise (3 storeys) to high rise (20 storeys and higher). Despite the changes to the energy target, there were no changes to the BASIX water target.

Table 20 - Comparison of Old BASIX and New BASIX Energy Target

	Old BASIX Energy Targets	New BASIX Energy Targets from Sustainable Buildings SEPP (from 1 October 2023)
Low rise (3 storeys)	45	67
Mid rise (4-5 storeys)	35	61
High rise (6-20 storeys)	25	60
High rise (20 storeys & higher)	25	63

Clause 7.25 of the Parramatta LEP 2023 effectively allows a high performing building FSR bonus of 5% where residential development can show that it can exceed the BASIX standards by a certain number of BASIX points. As a result of the changes to the BASIX standards in the Sustainable Buildings SEPP, these BASIX points exceedance targets likewise needed to be updated. This was to ensure that these standards continue to incentivise high performing building design over and above BASIX. Council commissioned Kinesis to undertake a study to determine these new BASIX exceedance targets – a copy of their study is available at Appendix 3. The Kinesis study has modelled two sustainability pathways across various building height and FSRs to understand what BASIX scores are achievable across different building heights and which pathways are cost-effective across different FSRs.

The Kinesis study concluded that the achievability of higher BASIX standards depends on building height and recommended new targets that are feasible for developers to achieve. These new BASIX exceedance targets have been adopted in this planning proposal so that clause 7.25 can be updated accordingly. The recommended targets included in this planning proposal are outlined in Table 4 in Part 1. These updated targets will ensure that new residential buildings in the Parramatta CBD continue to be incentivised to deliver high performing building design that is better than BASIX and thereby promote more sustainable environmental outcomes for the city.

Water recycling facilities in the E2 Commercial Centre zone

The planning proposal seeks to facilitate efficient water usage across the Parramatta CBD. The planning proposal introduces 'water recycling facility' as an additional permissible land use in the E2 Commercial Centre zone.

As outlined in Part 1 of this planning proposal, clause 7.24 (Dual water systems) of the Parramatta LEP 2023 requires construction of potable water and recycled water pipes to be provided for all new buildings in the CBD. This is to allow the security of water supply and optimise efficient water management for the Parramatta CBD.

The proposed change will promote a sustainable built environment across the CBD area in terms of water supply. The proposed permissibility of 'water recycling facility'

in the E2 Commercial Centre zone will complement the existing clause 7.24 (Dual water systems) provision by providing flexibility and options for water management, such as providing recycling facilities for treatment of stormwater. It will also match the current permissibility of this use in the other predominant zone of the Parramatta CBD, being the MU1 Mixed Use zone. It will allow resilient water infrastructure to be provided across the wider Parramatta CBD area, consistent with the Parramatta CBD policy framework, such as the Sustainability and Infrastructure Study 2015 & 2019.

Flooding

Most land within Parramatta CBD is flood affected. Developments within the Parramatta City Centre are regulated under Clause 7.11 Floodplain Risk Management under the Parramatta LEP 2023 and other relevant flooding risk management plans and policies.

The planning proposal is a continuity of the Parramatta CBD Planning Proposal and is consistent with relevant policy framework for the Parramatta CBD area, including Clause 7.11 (Floodplain Risk Management) of Parramatta LEP 2023 and the Update of Parramatta Floodplain Risk Management Plans (Molino Stewart 2021) (refer to copy at Appendix 5), which was prepared to support the Parramatta CBD Planning Proposal.

This planning proposal does not seek amendments to any flooding controls applicable to the Parramatta City Centre. The only site under this planning proposal that envisages some form of increased development density, which is affected by flooding up to the PMF*, is the Walker Corporation land holdings at 10-12 Darcy Street, Parramatta (also known as 4 & 6 & 8 Parramatta Square).

**N.B. – Council has prepared a new draft flood model which has been publicly exhibited. The flood level affectation of these sites may potentially change once the new model has been formally adopted.*

The proposed application of Clause 7.28 to the Walker Corporation landholdings at Parramatta Square will allow additional floorspace for office development only for this site. The proposed increase in density envisaged under this planning proposal is considered to be generally consistent with the overall density proposed under the Parramatta CBD Planning Proposal, and therefore continued application of Clause 7.11 (Floodplain risk management) is considered appropriate to address any flooding risks.

3.3.3 Has the planning proposal adequately addressed any social and economic effects?

The planning proposal addresses the following social effects:

- More car parking will be provided for those residents who are not located close to a heavy rail or metro station. This will provide opportunities for more residents in these areas to access a car for transportation, including to access services and work.
- The planning proposal removes the need for some proposed laneways that are no longer required – this will enable more public funds to be made available for other community infrastructure projects that are needed.

The planning proposal puts forward two key measures that will improve economic outcomes for the Parramatta CBD. These are summarised in Table 21 below.

Table 21 – Proposed changes that will improve economic outcomes for the Parramatta City Centre

Proposed change	Economic Effects
Proposed expansion of the E2 Commercial Centre zone and application of clause 7.28 (Additional FSR for office premises) over the Walker Corporation landholdings at Parramatta Square.	This will reaffirm the significance of Parramatta Square as a major premium A-Grade office precinct as a part of the city's commercial core. This measure will secure jobs and business opportunities, and also allow for potential intensification of commercial and business uses on this land, which is centrally located close to the Parramatta Transport Interchange Expansion of the E2 Commercial Centre zone is also consistent with the recommendations of the Achieving A-Grade Office Space in the Parramatta CBD Economic Review (Urbis, 2019) (refer to Appendix 2). Despite the Achieving A-Grade Office Space in the Parramatta CBD Economic Review (Urbis, 2019) being completed prior to COVID and the pandemic's associated impacts on the office market, its recommendations to expand the CBD's commercial core to include this land at Parramatta Square is still considered valid given the significant commercial office towers that have since been completed at Parramatta Square. The rezoning would also ensure consistency with the E2 Commercial Centre zoning of the other office towers at Parramatta Square, including the NAB Tower, Western Sydney University Tower, and the Sydney Water Tower, by extending the E2 Commercial Centre zoning west over the subject land.

3.4 Section D – State and Commonwealth Interests

3.4.1 Is there adequate public infrastructure for the planning proposal?

As this planning proposal is effectively a continuation of the Parramatta CBD Planning Proposal, it is considered that the Parramatta City Centre Local Infrastructure Contributions Plan 2022 (Amendment No 2) (April 2024) will be adequate to provide for local infrastructure in support of the planning proposal (noting that contributions plan was prepared in support of the Parramatta CBD Planning Proposal). This contributions plan has an infrastructure works schedule of $1.98 billion and applies a

flat rate levy (based on cost of works) on new development of 5% for residential development, and 4% for commercial development.

Further to this program of local infrastructure works under Council's contribution plan, the NSW Government's investment in Light Rail and Sydney Metro West will also support the planning proposal, as well as ongoing investment in heavy rail and the bus interchange.

3.4.2 What are the views of State and federal public authorities and government agencies consulted in order to inform the Gateway determination?

Consultation with the State and Commonwealth public authorities will be undertaken once the gateway determination has been issued.

PART 4 – MAPPING

This section contains existing and proposed controls for mapping and other provisions being sought under this planning proposal in accordance with the Department's Local Environmental Plan Making Guideline (August 2023).

4.1 Mapping

This planning proposal seeks to amend and/or create the following maps:

- Amend the Land Zoning Map as it applies to Walker Corporation Landholdings at Parramatta Square.
- Amend the Special Provisions Area Map to include the Walker Corporation Landholdings sites as a part of Area B.
- Create a new Land Use and Transport Integration (LUTI) Map identifying Category A and Category B residential car parking rates.
- Amend the Land Reservation Acquisition Map to add, delete and amend multiple acquisition notations related to (proposed or current) laneways, road widenings and splay corners.

Sections 4.3 and 4.4 of this planning proposal show the existing maps and the proposed map changes.

4.2 Other Provisions

This planning proposal also seeks to change other provisions do not need to be mapped, including the following:

- Amendments to clause 7.25 – High performing building design;
- Land use permissibility in the E2 Commercial Centre zone (Item 3) – "Water recycling facilities"; and
- Amendments to clause 7.17 – Car parking—general.

These changes are covered in more detail in Section 4.5 of this planning proposal.

4.3 Existing mapping controls

This section illustrates the current *Parramatta LEP 2023* mapping controls, which apply to different sites within the planning proposal.

Walker Corporation Landholdings – 10-12 Darcy Street, Parramatta (also known as 4 & 6 & 8 Parramatta Square)

- Existing MU1 Mixed Use Zone

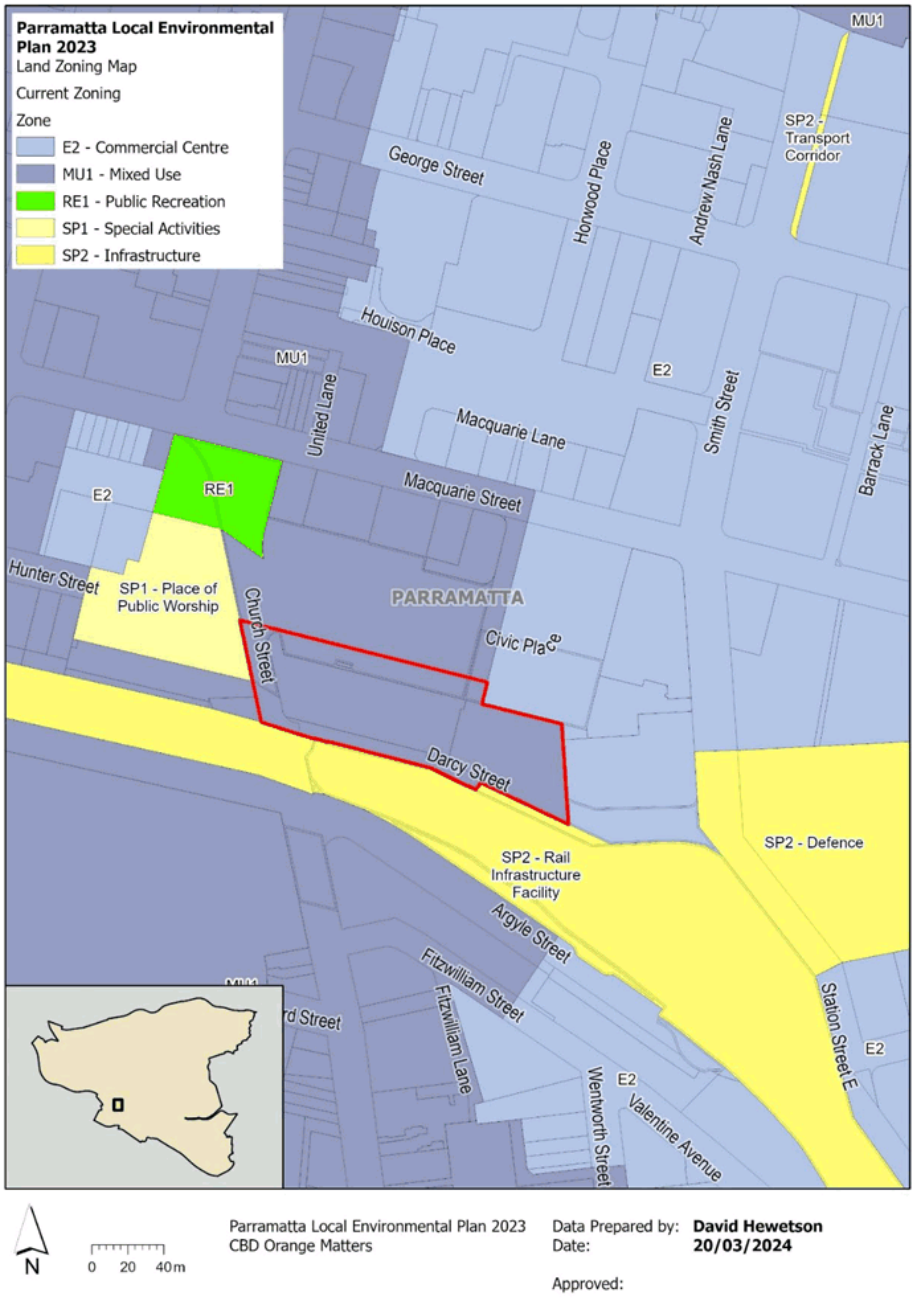


Figure 7 - Existing zoning for Walker Corporation Landholdings at 10-12 Darcy Street, Parramatta (also known as 4 & 6 & 8 Parramatta Square)

- Existing Special Provisions Area Map

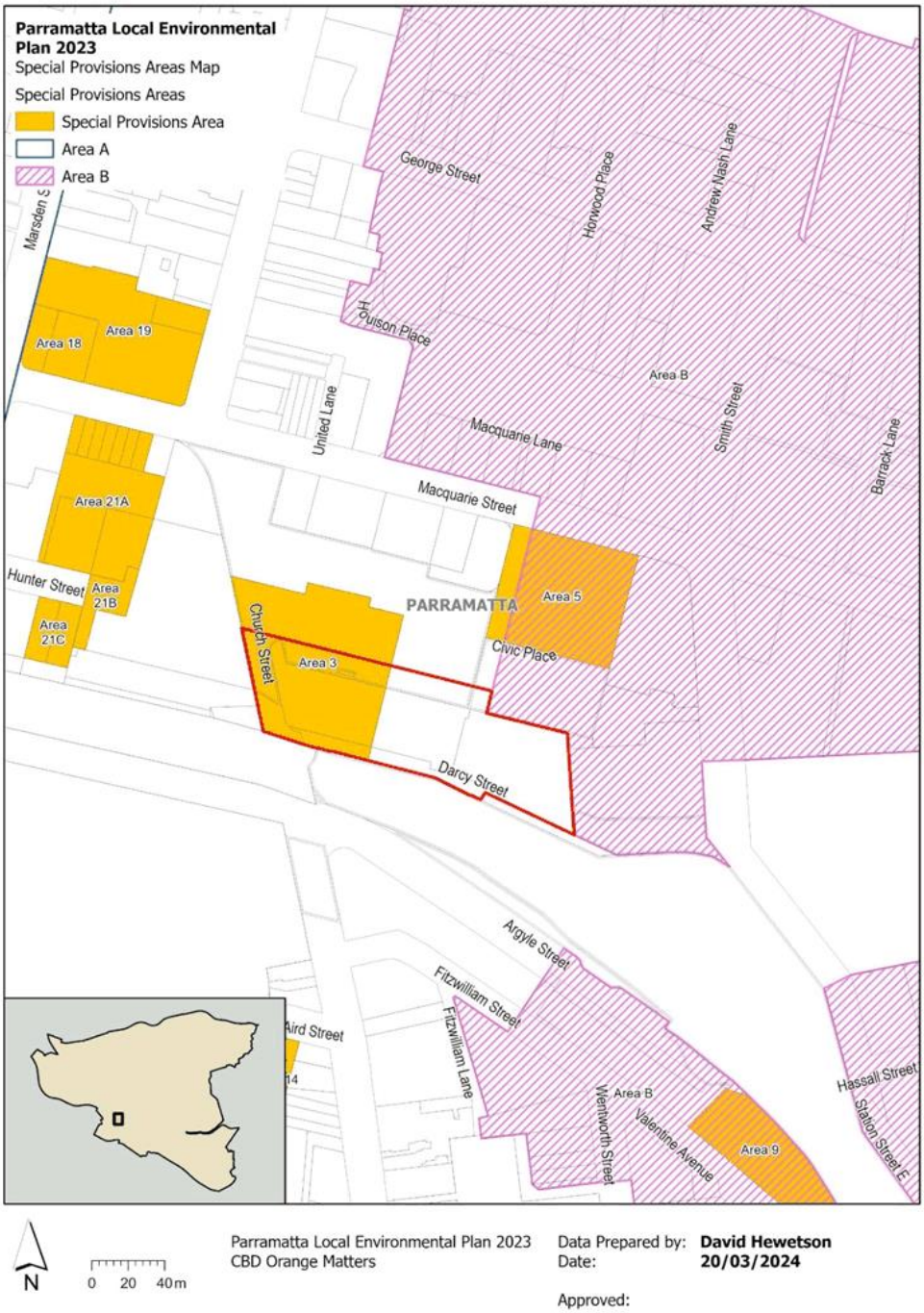


Figure 8 - Existing Special Provisions Area Map – Walker Corporation Landholdings at 10-12 Darcy Street, Parramatta (also known as 4 & 6 & 8 Parramatta Square)

Multiple Land Reservation Acquisition (LRA) Map notations within the Parramatta CBD

- Existing LRA Map at Marsden Lane - 215 Church Street, Parramatta

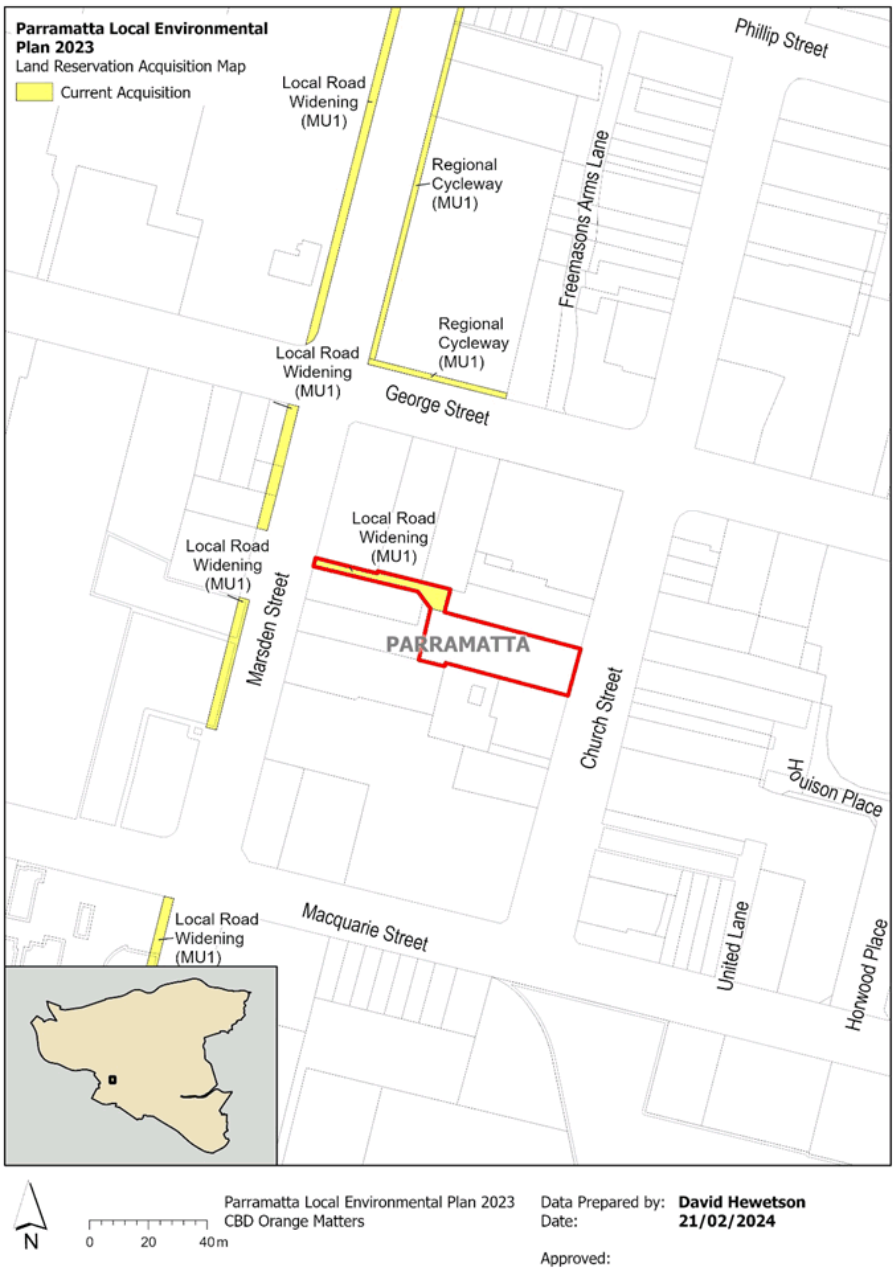


Figure 9 - Existing LRA Map at Marsden Lane - 215 Church Street, Parramatta

- Existing LRA Map at:
  - Fire Horse Lane - 3 Fitzwilliam Street, Parramatta
  - Woodhouse Lane - 21 Wentworth Street, Parramatta

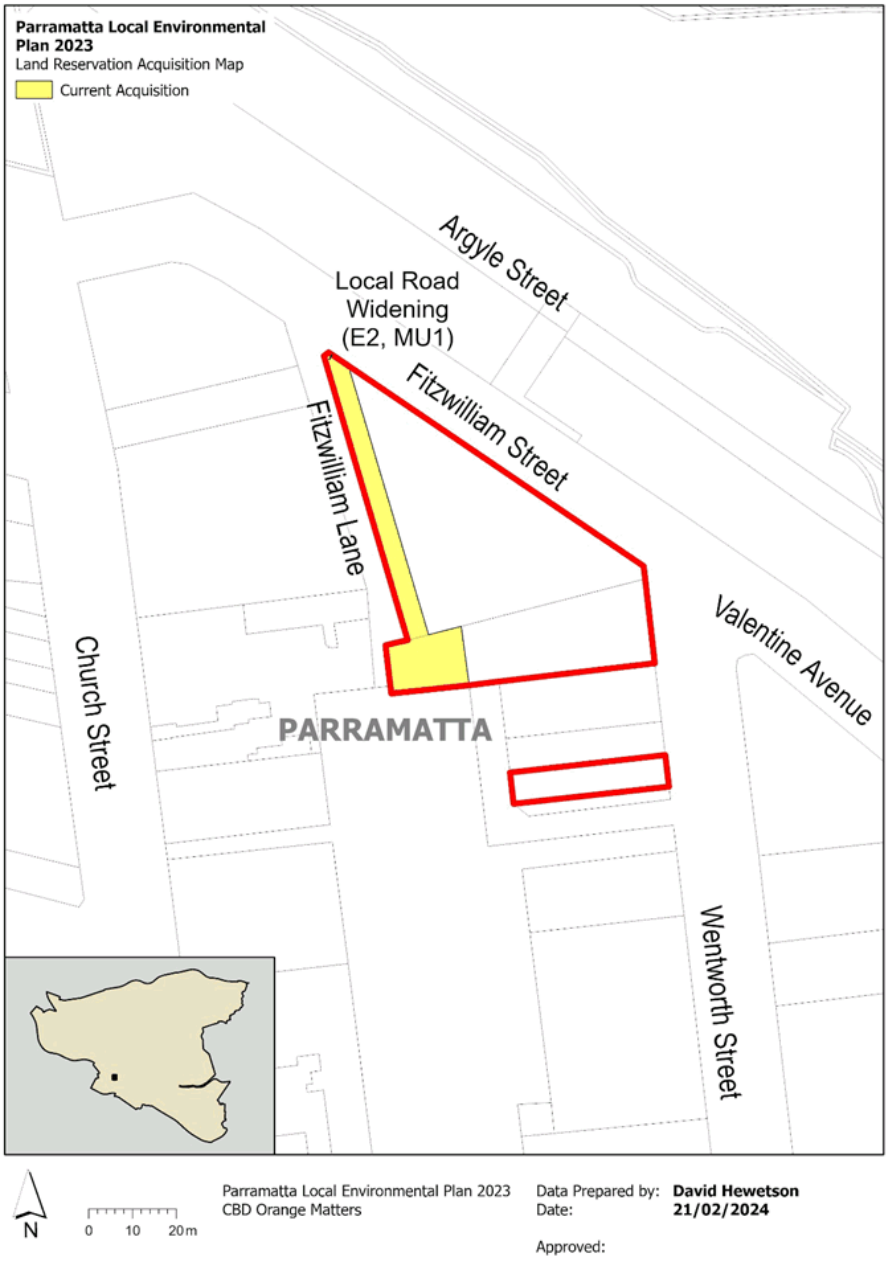


Figure 10 - Existing LRA Map at Fire Horse Lane & Woodhouse Lane

Existing LRA Map at:

- Charles Street/Hassall Street Intersection, being 2 Charles Street, Parramatta;
- 24 Parkes Street, Harris Park

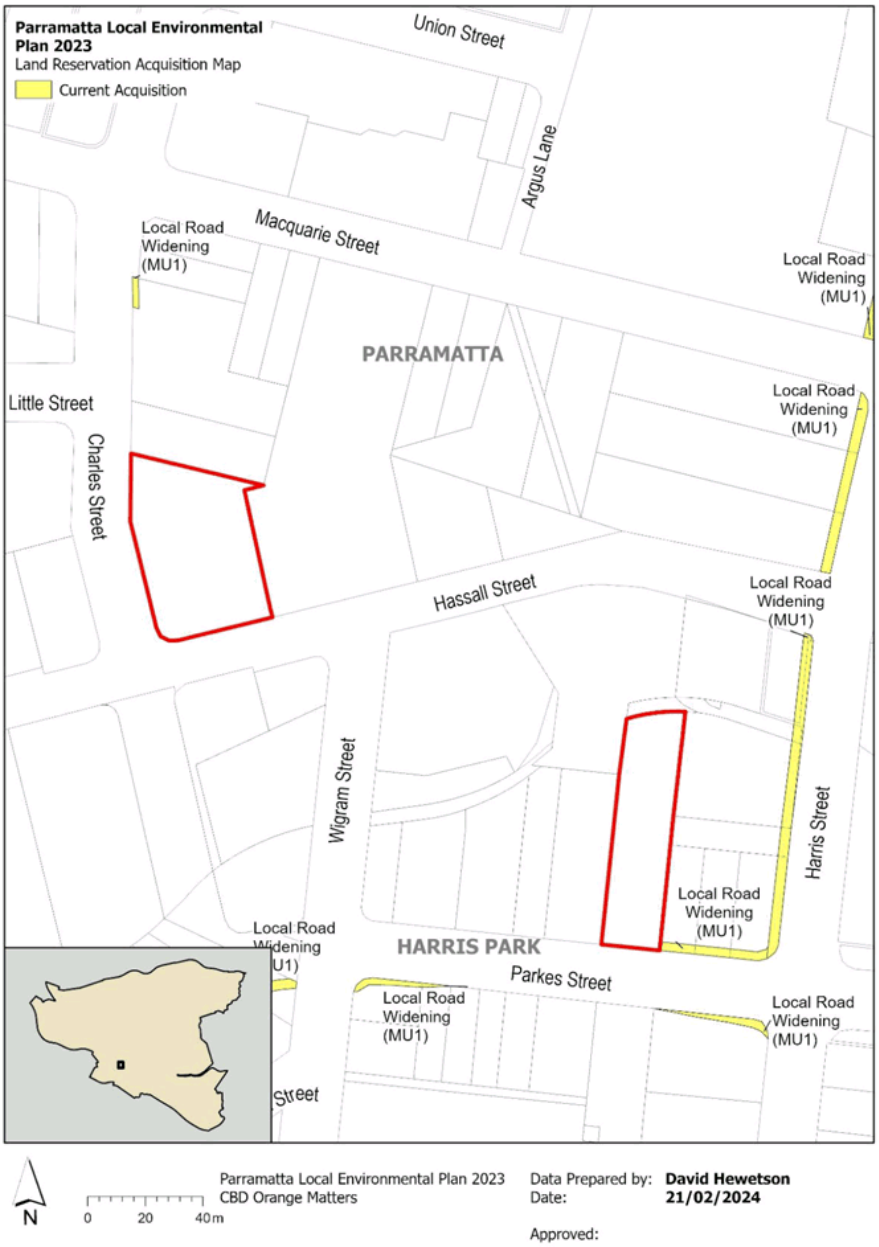


Figure 11 - Existing LRA Map at Charles Street/Hassall Street Intersection, being 2 Charles St, Parramatta; and also 24 Parkes Street, Harris Park

- Existing LRA Map at 328 Church Street, Parramatta

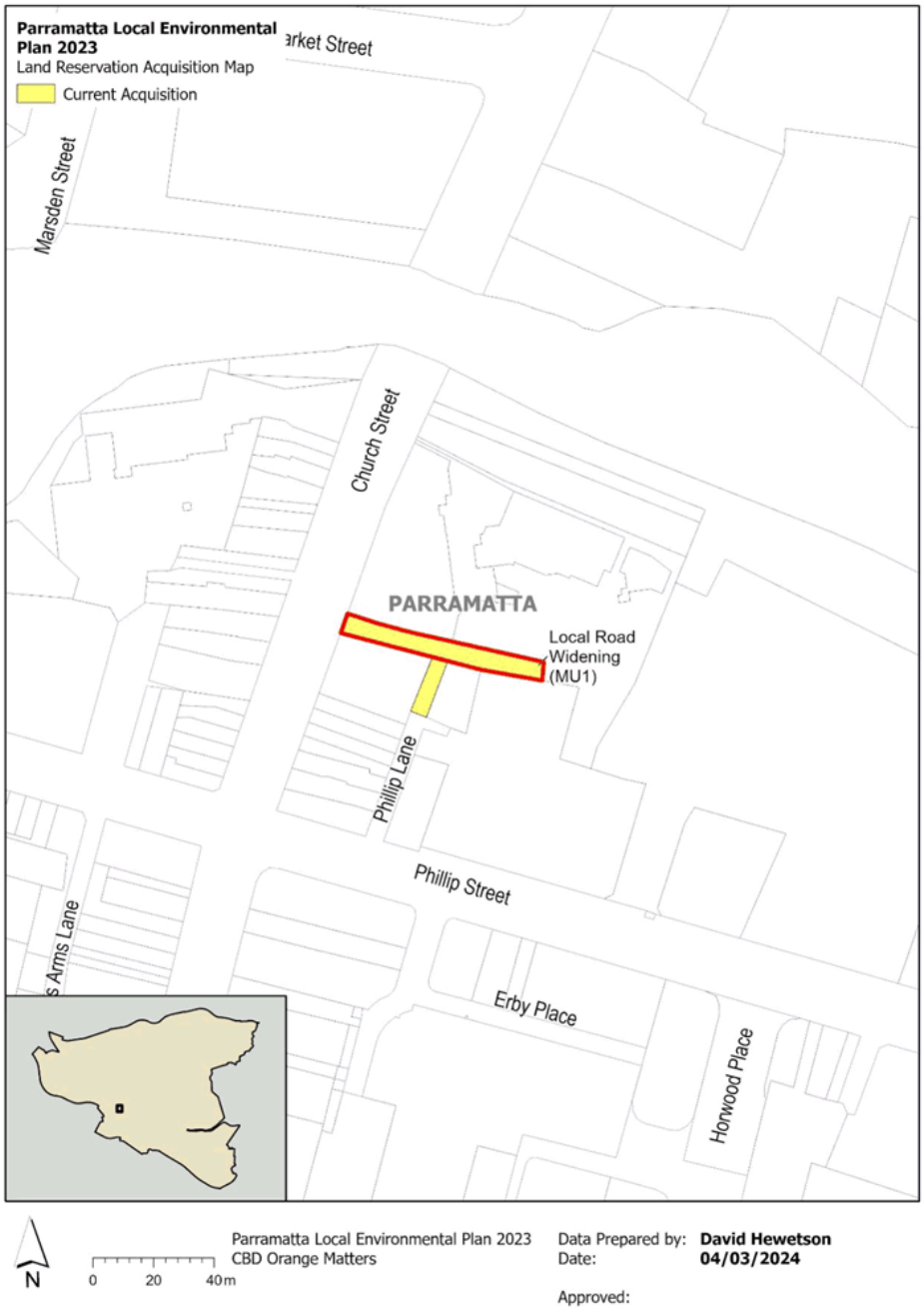


Figure 12 - Existing LRA Map at 328 Church Street, Parramatta

4.4 Proposed mapping controls

This section illustrates the proposed mapping changes as applicable to relevant sites within the planning proposal.

Walker Corporation Landholdings - 10-12 Darcy Street, Parramatta (also known as 4 & 6 & 8 Parramatta Square)

- Proposed Land Zoning Map

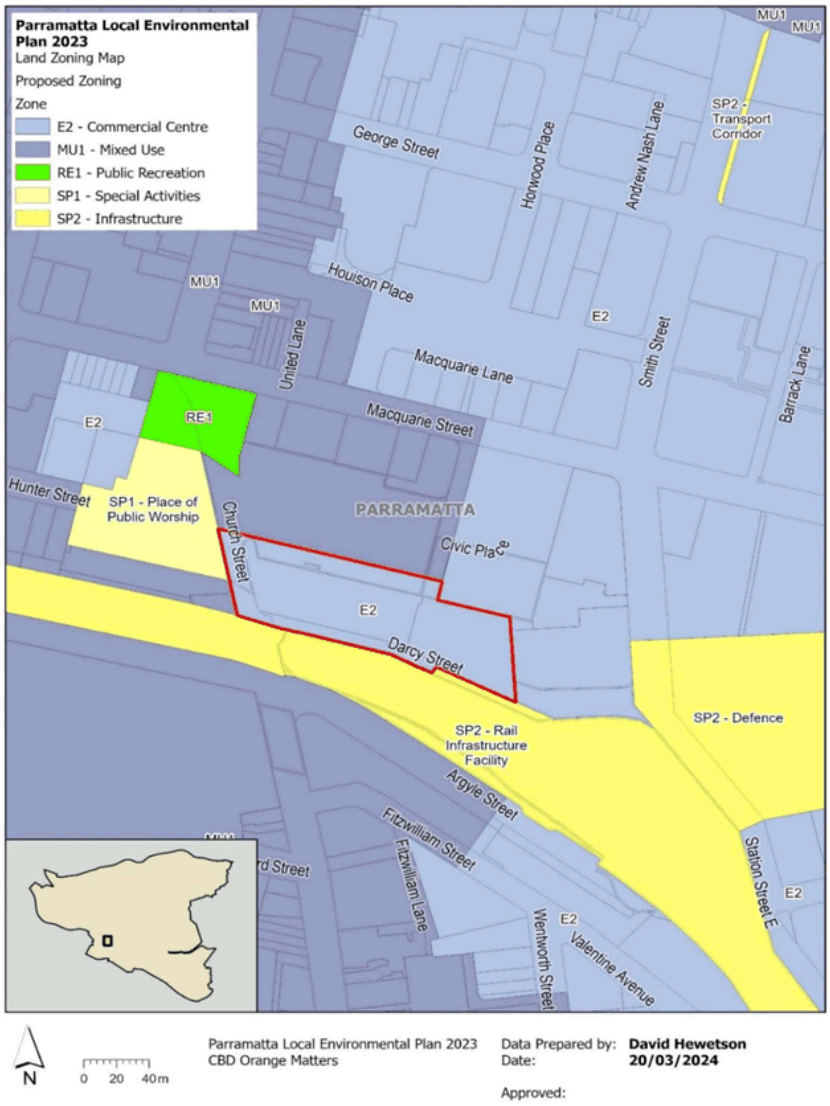


Figure 13 - Proposed zoning for Walker Corporation Landholdings at 10-12 Darcy Street, Parramatta (also known as 4 & 6 & 8 Parramatta Square)

- Proposed Special Provisions Area Map

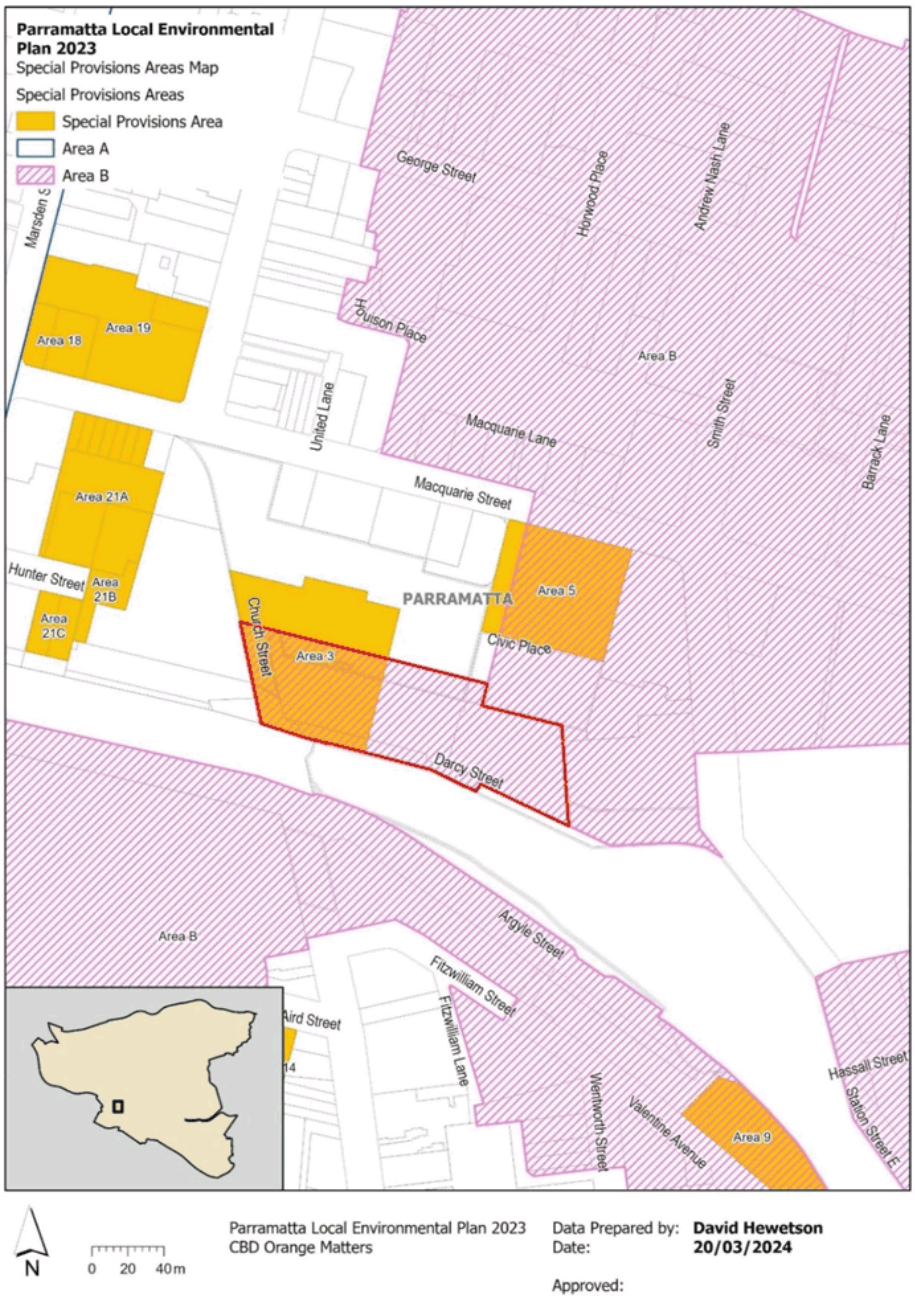


Figure 14 - Proposed Special Provisions Area Map for Walker Corporation Landholdings at 10-12 Darcy Street, Parramatta (also known as 4 & 6 & 8 Parramatta Square) – extension of Area B

Proposed Land Reservation Acquisition (LRA) Map changes

- Delete LRA at Marsden Lane - 215 Church Street, Parramatta

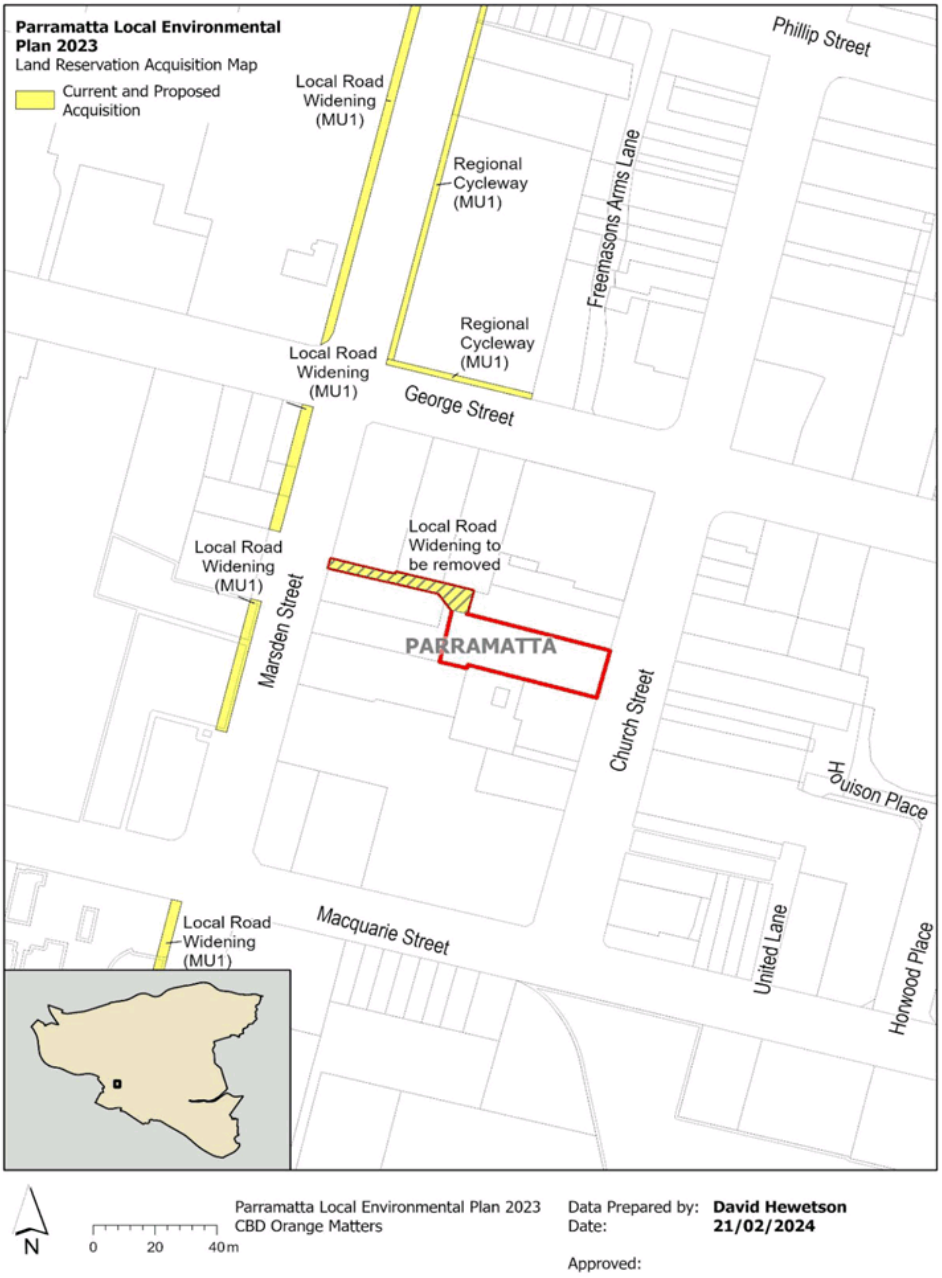


Figure 15 - Proposed LRA Map amendment to Marsden Lane - 215 Church Street, Parramatta

- Proposed LRA Map changes at:
  - Fire Horse Lane - 3 Fitzwilliam Street, Parramatta – delete part of LRA;
  - Woodhouse Lane - 21 Wentworth Street, Parramatta – add splay corner LRA.

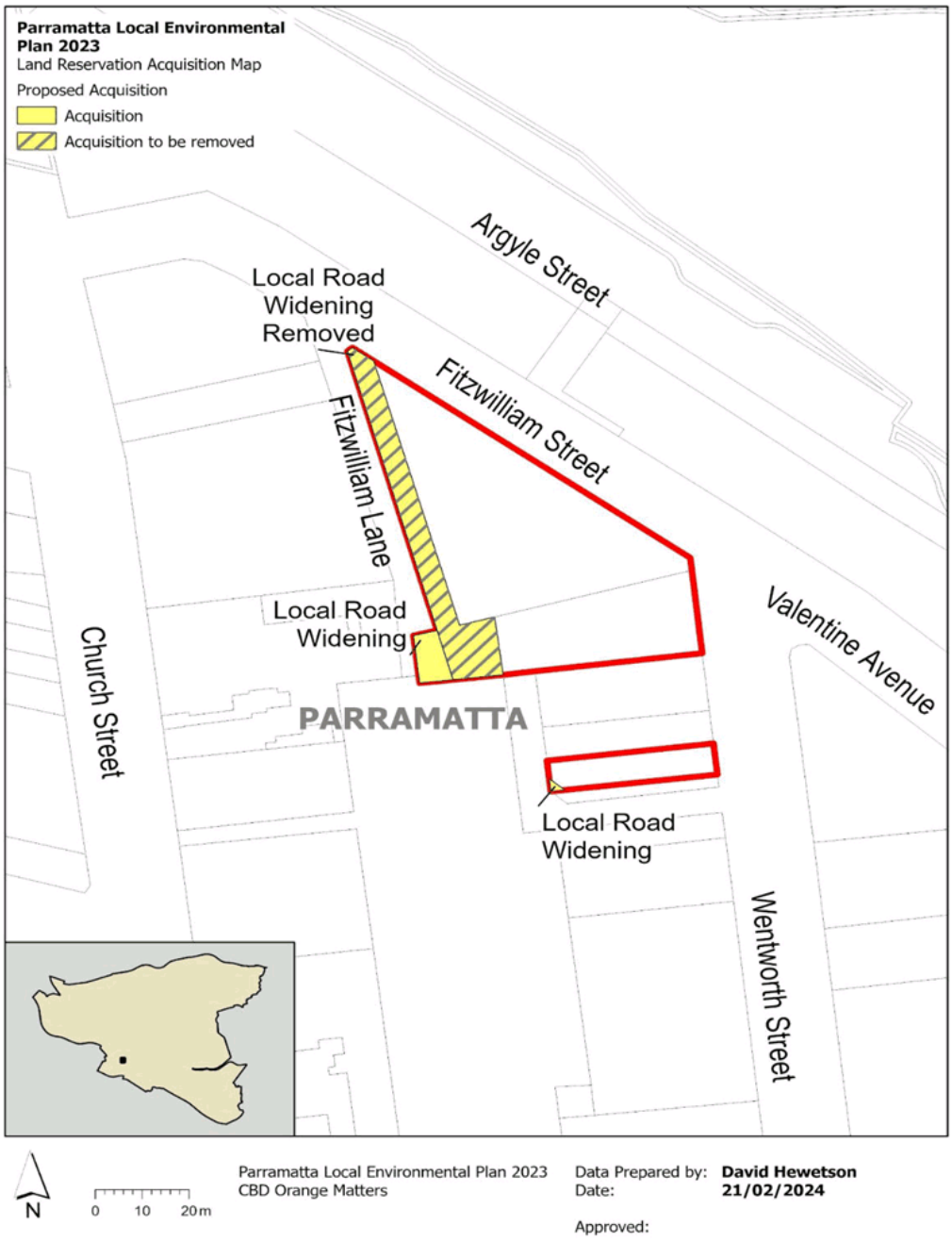


Figure 16 - Proposed LRA Map amendments to Fire Horse Lane - 3 Fitzwilliam Street, Parramatta and Woodhouse Lane - 21 Wentworth Street, Parramatta

- Proposed LRA Map changes at:
  - Charles Street/Hassall Street Intersection - 2 Charles Street, Parramatta - add splay corner/road widening LRA;
  - 24 Parkes Street, Harris Park – add road widening LRA.

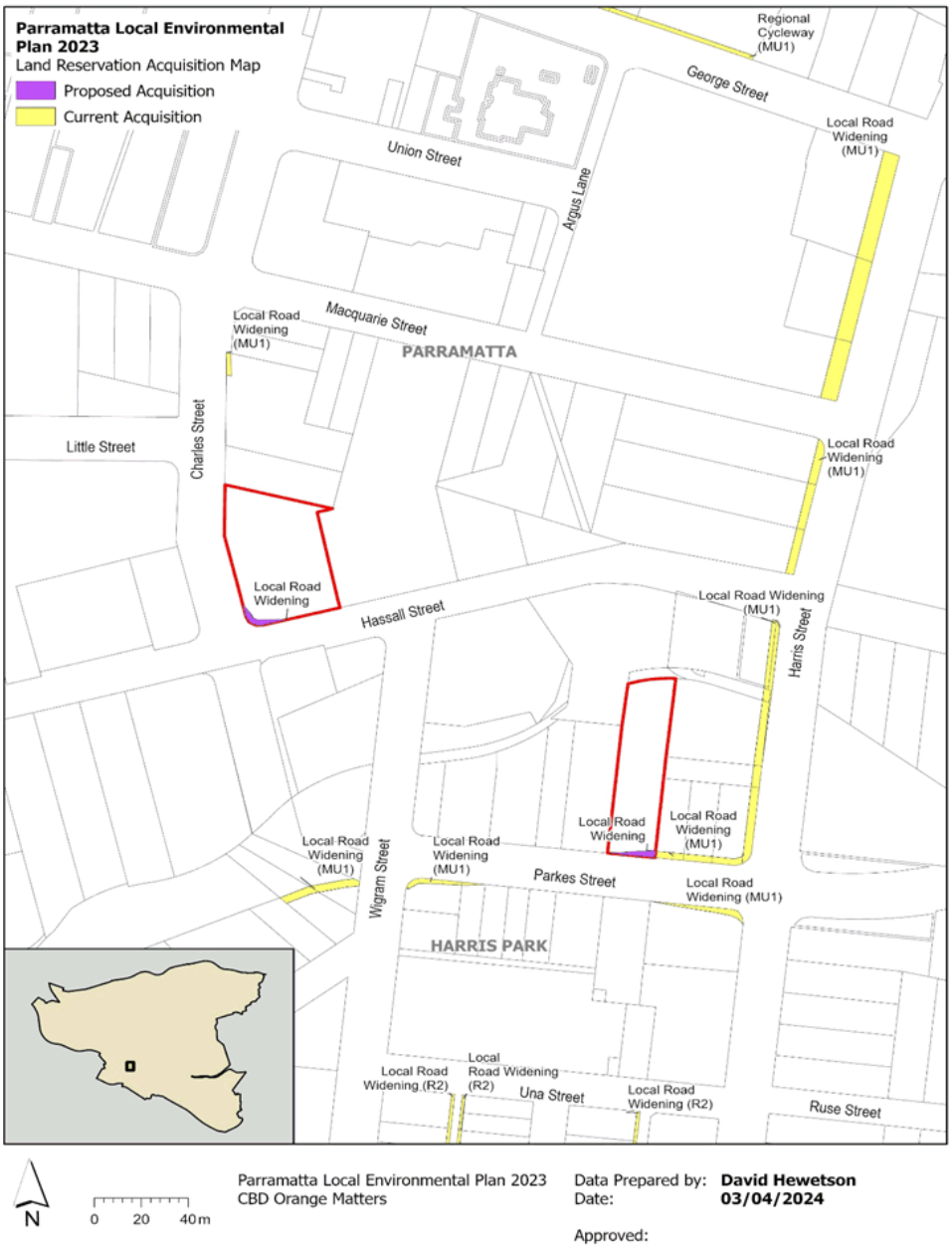


Figure 17 - Proposed LRA Map amendments to Charles Street/Hassall Street Intersection - 2 Charles Street, Parramatta & 24 Parkes Street, Harris Park

- Proposed LRA Map change at 328 Church Street, Parramatta – delete LRA

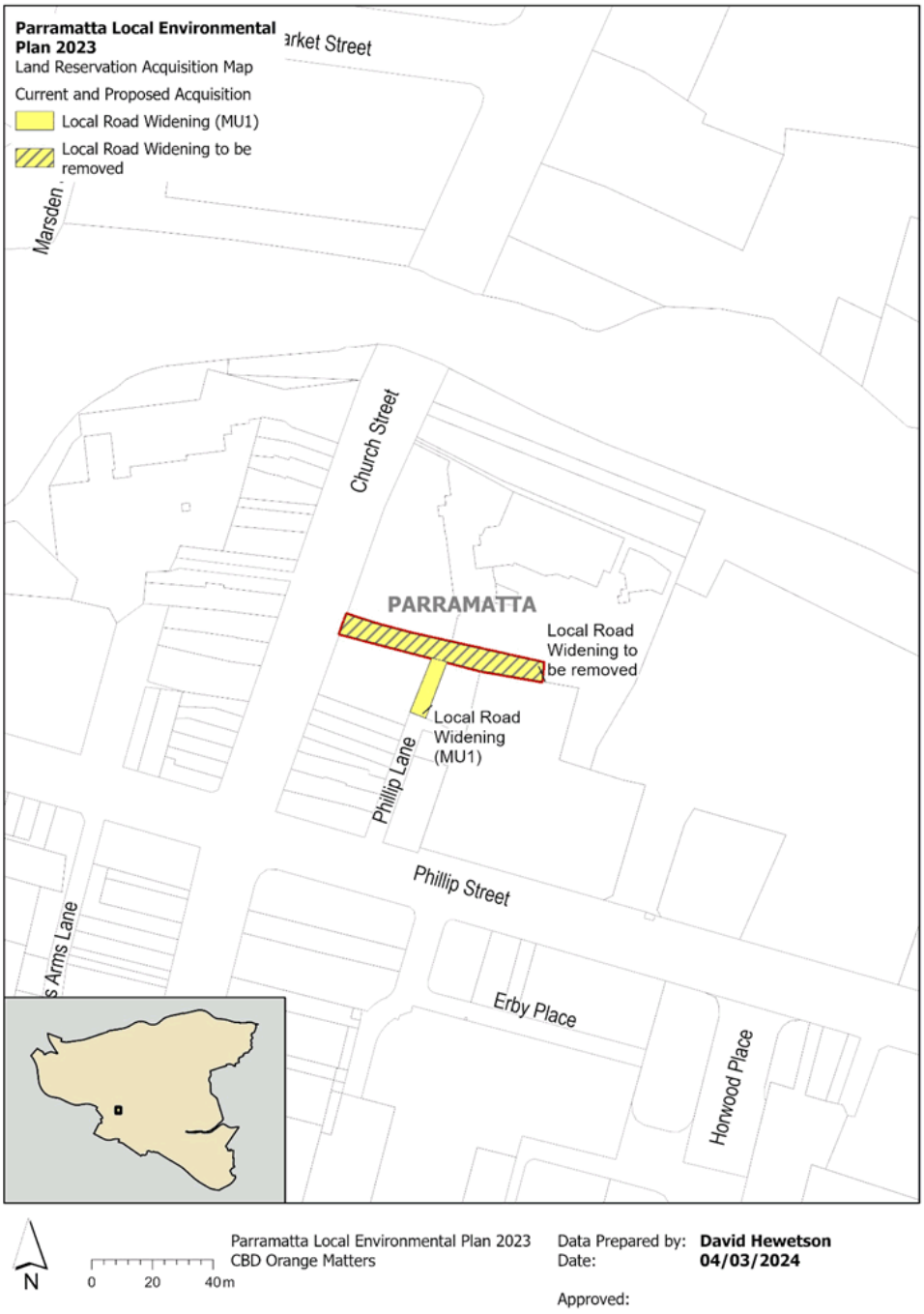


Figure 18 - Proposed LRA Map amendment at 328 Church Street, Parramatta

Proposed Land Use and Transport Integration Map

- Proposed Land Use and Transport Integration Map, showing Category A and Category B residential car parking rate areas

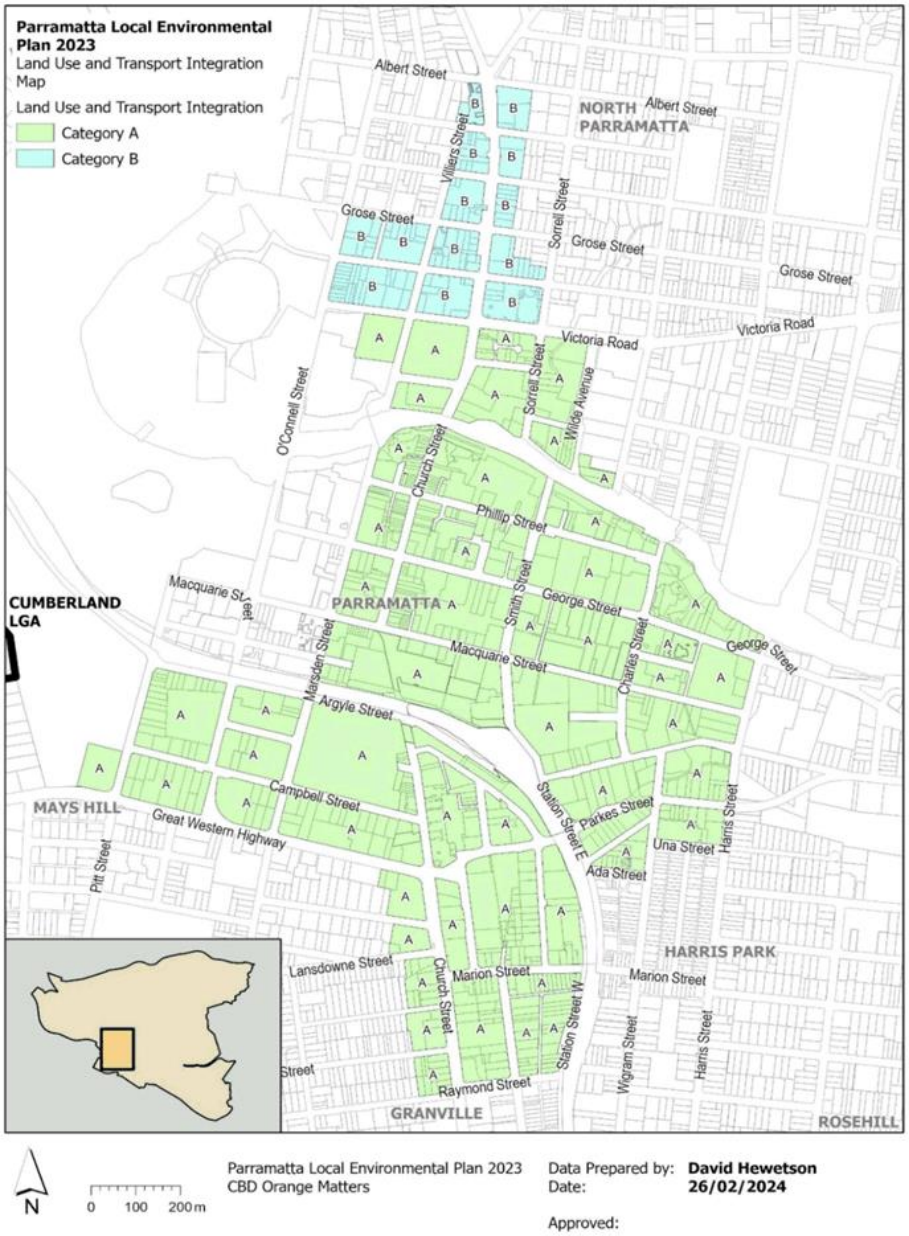


Figure 19 - Proposed Land Use and Transport Integration Map showing Category A and Category B residential car parking rate areas

4.5 Other Provisions (Technical Details)

This section illustrates proposed changes to other provisions that do not involve a mapping change.

High Performing Building Design – Clause 7.25

- **Existing Clause 7.25(3)(c)(ii) of Parramatta LEP 2023**

(3) A building resulting from, or significantly altered or added to by, development specified in subclause (2)(e) may exceed the maximum permissible FSR by up to 5% if the consent authority is satisfied of the following—
(c) the part of the building that is a dwelling is capable of exceeding—
(ii) the applicable BASIX target for energy by at least the amount of points specified for the building in the following table, or equivalent—

	Building with FSR of at least 6:1 but less than 14:1	***Building with FSR of at least 14:1***
Height of building	***BASIX points***	***BASIX points***
5–15 storeys	*25*	*15*
16–30 storeys	*20*	*10*
31–40 storeys	*10*	*10*
41 or more storeys	*10*	*10*

- **Proposed Clause 7.25(3)(c)(ii) of Parramatta LEP 2023 (change in red)**

(3) A building resulting from, or significantly altered or added to by, development specified in subclause (2)(e) may exceed the maximum permissible FSR by up to 5% if the consent authority is satisfied of the following—
(c) the part of the building that is a dwelling is capable of exceeding—
(ii) the applicable BASIX target for energy by at least the amount of points specified for the building in the following table, or equivalent—

Height of building	***Building with FSR ranging from 6:1 to 16:1***
	BASIX points
5-15 storeys	*25*
16-30 storeys	*20*
31-40 storeys	*15*
41 or more storeys	*15*

Land use permissibility in the E2 Commercial Centre zone (Item 3) – "Water recycling facilities"

- **Existing land use permissibility in the E2 Commercial Centre zone**

Zone E2 Commercial Centre (Item 3)

3 Permitted with consent

Amusement centres; Artisan food and drink industries; Backpackers' accommodation; Building identification signs; Business identification signs; Car parks; Centre-based child care facilities; Commercial premises; Community facilities; Educational establishments; Entertainment facilities; Function centres; Home businesses; Home industries; Home occupations; Hospitals; Hotel or motel accommodation; Information and education facilities; Local distribution premises; Medical centres; Mortuaries; Oyster aquaculture; Passenger transport facilities; Places of public worship; Public administration buildings; Recreation areas; Recreation facilities (indoor); Recreation facilities (outdoor); Registered clubs; Respite day care centres; Restricted premises; Roads; Tank-based aquaculture; Tourist and visitor accommodation; Vehicle repair stations; Veterinary hospitals

- **Proposed land use permissibility in the E2 Commercial Centre zone (change in red)**

Zone E2 Commercial Centre (Item 3)

3 Permitted with consent

Amusement centres; Artisan food and drink industries; Backpackers' accommodation; Building identification signs; Business identification signs; Car parks; Centre-based child care facilities; Commercial premises; Community facilities; Educational establishments; Entertainment facilities; Function centres; Home businesses; Home industries; Home occupations; Hospitals; Hotel or motel accommodation; Information and education facilities; Local distribution premises; Medical centres; Mortuaries; Oyster aquaculture; Passenger transport facilities; Places of public worship; Public administration buildings; Recreation areas; Recreation facilities (indoor); Recreation facilities (outdoor); Registered clubs; Respite day care centres; Restricted premises; Roads; Tank-based aquaculture; Tourist and visitor accommodation; Vehicle repair stations; Veterinary hospitals; Water recycling facilities

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Amendments to clause 7.17 – Car parking—general

- **Existing clause 7.17(2)**

Clause 7.17 Car parking—general

(2) The maximum number of car parking spaces, including existing car parking spaces, for development to which this clause applies is the number calculated for the land use in accordance with the following table:

Land Use	Maximum number of car parking spaces

Residential flat buildings, dual occupancies and multi dwelling housing	The sum of the following— 0.1 space for each studio dwelling, 0.3 space for each dwelling containing 1 bedroom, 0.7 space for each dwelling containing 2 bedrooms, 1 space for each dwelling with 3 or more bedrooms

N.B. The table to clause 7.17(2) includes a number of land uses with car parking rates that are unaffected by this planning proposal and not subject to any change. The table above only shows the land use which is subject to change.

- **Proposed clause 7.17(2) (changes in red)**

Clause 7.17 Car parking—general

(2) The maximum number of car parking spaces, including existing car parking spaces, for development to which this clause applies is the number calculated for the land use in accordance with the following table—

Land Use	**Maximum number of car parking spaces**
Residential flat buildings, dual occupancies and multi dwelling housing (for land identified as 'Category A' on Land Use and Transport Integration Map).	The sum of the following— (a) 0.1 space for each studio dwelling, (b) 0.3 space for each dwelling containing 1 bedroom, (c) 0.7 space for each dwelling containing 2 bedrooms, (d) 1 space for each dwelling with 3 or more bedrooms
Residential flat buildings, dual occupancies and multi dwelling housing (for land identified as 'Category B' on Land Use and Transport Integration Map).	The sum of the following— Resident spaces: (a) 0.2 space for each studio dwelling, (b) 0.4 space for each dwelling containing 1 bedroom, (c) 0.8 space for each dwelling containing 2 bedrooms, (d) 1.1 space for each dwelling containing 3 or more bedrooms, Visitor spaces (calculated cumulatively): (e) 0.167 space for each dwelling up to 30 dwellings, (f) 0.1 space for each dwelling more than 30 and up to 70 dwellings, (g) 0.05 space for each dwelling more than 70 dwellings

N.B. The table to clause 7.17(2) includes a number of land uses with car parking rates that are unaffected by this planning proposal and not subject to any change. The table above only shows the land uses which are subject to change.

PART 5 – COMMUNITY CONSULTATION

The planning proposal will be publicly exhibited for community consultation subject to receipt a Gateway Determination. The gateway determination will specify the level of public consultation that must be undertaken in relation to the planning proposal including consultation with relevant government agencies.

Consistent with sections 3.34(4) and 3.34(8) of the EP&A Act 1979, where community consultation is required, an instrument cannot be made unless the community has been given an opportunity to make submissions and the submissions have been considered.

PART 6 – PROJECT TIMELINE

Once the planning proposal has been referred to the Minister for review and Council has received a Gateway determination accordingly, the anticipated project timeline will be further refined, including at each major milestone throughout the planning proposal's process.

Table 22 below outlines the anticipated timeframe for the completion of the planning proposal.

Table 22 – Anticipated timeframe for the planning proposal process

MILESTONE	ANTICIPATED TIMEFRAME
Report to LPP on the assessment of the PP	May 2024
Report to Council on the assessment of the PP	June 2024
Referral to Minister for Gateway determination	July 2024
Date of issue of the Gateway determination	October 2024
Commencement and completion dates for public exhibition period	November 2024 – December 2024
Commencement and completion dates for government agency notification	November - December 2024
Consideration of submissions	January 2025 – February 2025
Consideration of planning proposal post exhibition and associated report to Council	March 2025
Submission to the Department to finalise the LEP	April 2025
Notification of instrument	June 2025

APPENDICES

Appendix 1 – Council Resolution of 15 June 2021 – Decision Pathway 3 – Orange Matters

Table 3 below comprises the changes to the Draft LEP Instrument and/or Draft LEP Maps that **'have merit for further investigation'** (via Decision Pathway 3). These changes will be investigated during a later stage of work and progressed through separate Planning Proposal amendment processes. They have also been categorised into proposed groupings, so as to improve efficiencies in delivering these next stages of work.

With regards to Table 3 below, the proposed groupings (see last column) are as follows:

- Group 1 – Dealing with policy matters raised by State agencies and/or have been flagged in supporting policy (e.g. the Integrated Transport Plan) or related matters.
- Group 2 – Affecting commercial uses and public domain
- Group 3 – Affecting long-term matters
- Group 4 – Potential additional height/FSR, which requires further detailed technical analysis.

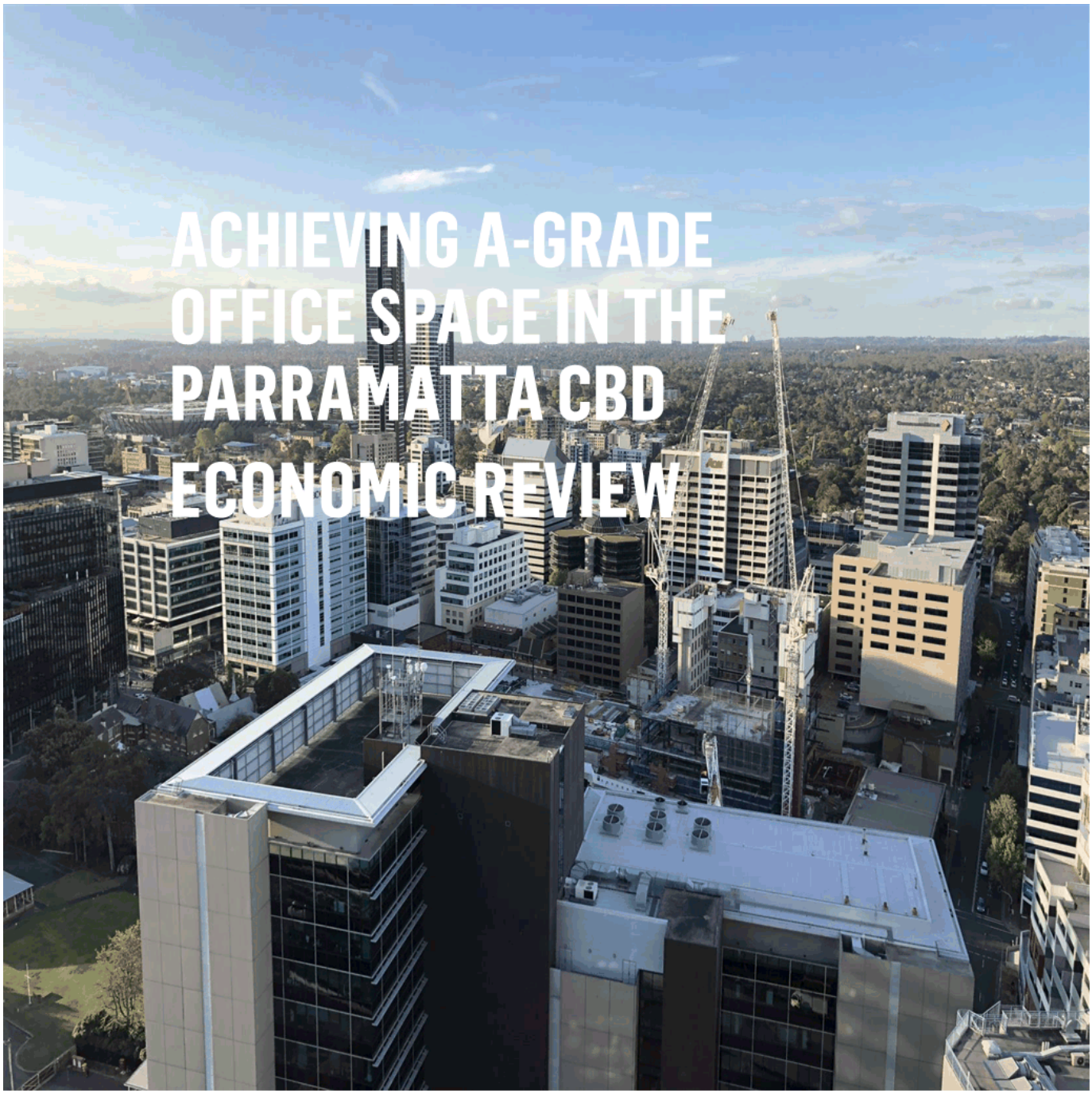
● **Table 3 – Changes that have merit for further investigation (via Decision Pathway 3 - Orange)**

#	Submission No. and Requested change (Decision Pathway 3)	Submission No.	Proposed Grouping
1.	Consistent with Council Resolution on 15 June 2021 part (b2)(iv), Council Officers will reinstate the exhibited 18m height control, and then undertake further investigations for ***69 George Street (the Roxy Theatre site)*** at a later stage. The resolution reads as follows: *(iv) Reinstate the exhibited draft height control for the Roxy Theatre (69 George Street) of 18m when sending the CBD PP to DPIE for finalisation and undertake further investigations at a later stage (under Decision Pathway 3 – Orange), including heritage investigations, to determine if this height could potentially be increased to respond to strategic planning work for Civic Link and Sydney Metro, and also to allow possible transition of the building to a larger, modern theatre venue.*	161	Group 2
2.	Investigate the mapping of **57 Macquarie Street, 41-43 Hunter Street, 45 Hunter Street** and **87 Marsden Street** on the Additional Local Provisions Map with the Minimum Commercial Provision notation.	180, 200 and 243	Group 2
3.	For **64 High Street**, investigate the realignment of the east-west laneway between High Street and Church Street shown on the Height of Building Map and Incentive Height of Building Map with a 0 metre height notation, to the southern boundary of 64 High Street. This investigation is to occur in consultation with other affected landowners(s) to the east along the route of the laneway where it intersects with Church Street.	181	Group 3
4.	For the **Westfield landholdings**, investigate rezoning the land from B4 Mixed Use to B3 Commercial Core (as exhibited) with a potential Additional Permitted Use (APU) for a residential tower, consistent with the Urbis A-Grade Office Space Study recommendations (given the large size of this site that could accommodate both residential and commercial towers) and also further urban design analysis to determine the appropriate size of the residential tower (which would be referenced accordingly in an APU notation). See also **Table 1, Row 2**, that details a change recommended to be supported for the Westfield landholdings and is included within the updated CBD PP documentation recommended to be forwarded to the DPIE for finalisation.	182 and 299	Group 2
5.	Consistent with Council Resolution on 15 June 2021 part (b2)(ii), Council Officers will undertake investigations for **60 Phillip Street.** The resolution reads as follows:	198	Group 4

Summary of Council endorsed position on submissions received during exhibition of the CBD Planning Proposal

#	Submission No. and Requested change (Decision Pathway 3)	Submission No.	Proposed Grouping
	(ii) For 60 Phillip Street, undertake further urban design investigations under Decision Pathway 3 – Orange to determine if additional bonus FSR (under the high performing buildings, unlimited commercial floor space and Opportunity Sites clauses) can potentially be achieved within the height established under the exhibition version of the CBD PP, despite its size of approximately 1,580sqm (i.e. less than the 1,800sqm normally required to meet these FSR bonuses), given this site's unique circumstances as an isolated site bound by three public roads and the river foreshore.		
6.	Investigate potential increased height and FSR controls for the two **street blocks bound by Pitt Street, Campbell Street, Marsden Street and the Great Western Highway** at a later stage as a part of a separate piece of strategic work.	207, 266 and 270	Group 4
7.	Undertake further investigation of the FSR only of the B4 Mixed Use zoned **land bound by Fitzwilliam Street, Parkes Street, Church Street and Wentworth Street** at a later stage as a part of a separate piece of strategic work.	203	Group 4
8.	For **328 Church Street ('El Phoenician site')**, investigate the financial implications for Council regarding the Land Reservation Acquisition notation as it currently applies to this land in relation to a proposed laneway.	261	Group 2
9.	Investigate potential increased height and FSR controls for **12A Parkes Street**, at a later stage as a part of a separate piece of strategic work.	263	Group 4
10.	Investigate potential refinements to the **car parking rates** and any amendments to the **Local Road Reservations** following the public exhibition of the Integrated Transport Plan and endorsement by Council of any amendments as part of an alternative planning pathway.	276A, 276B and 288 and Transport for NSW	Group 1
11.	For **Walker Corporation landholdings at Parramatta Square**, investigate rezoning the land from B4 Mixed Use (as exhibited) to B3 Commercial Core.	281	Group 2
12.	Investigate potential increased height control for **56 Station Street East, Harris Park** at a later stage as a part of a separate piece of strategic work.	286	Group 4
13.	Investigate the inclusion of '**water recycling facilities'** as a permissible use within the B3 Commercial Core; and investigate the inclusion of '**water supply systems'** within the B3 Commercial Core and B4 Mixed Use Zone, to provide for maximum flexibility for water supply systems.	292	Group 1
14.	Investigate inserting new objectives for the RE1 (Public Recreation) zone related to **protection and enhancement of ecological values**, e.g. to preserve and enhance tree canopy, wildlife corridors and natural habitat, including waterways and riparian vegetation.	P-9	Group 1
15.	Consistent with Council Resolution on 15 June 2021 part (b1), Council Officers will consider amendments to subclause in Clause 7.3 (parking). The resolution reads as follows: *(b1) That Council approve the inclusion in Table 3 of Attachment 1 ('Changes that have merit for further investigation (via Decision Pathway 3 - Orange)') consideration of an additional subclause in Clause 7.3 (parking) requiring the provision of parking spaces for car share vehicles in each new development.*	N/A Council Resolution based on LPP advice	Group 1
16.	Consistent with Council Resolution on 15 June 2021 part (b2)(iii), Council Officers will undertake further investigation of building separation in the Phillip Street Block as a part of the CBD DCP preparation. The resolution reads as follows: *(iii) That as part of the preparation of the Draft Parramatta CBD Development Control Plan that controls be investigated to ensure that there are separations between buildings for the Phillips Street block (referred to in (i) above) from ground level upwards and including the tower elements to maintain visual and physical connectivity between the river and the broader CBD to the south.*	N/A Council Resolution	N/A. To be undertaken as a part of the DCP preparation.

Appendix 2 – Achieving A-Grade Office Space in the Parramatta CBD Economic Review (Urbis, 2019)



ACHIEVING A-GRADE OFFICE SPACE IN THE PARRAMATTA CBD ECONOMIC REVIEW

13 SEPTEMBER 2019
FINAL
PREPARED FOR CITY OF PARRAMATTA

URBIS

URBIS STAFF RESPONSIBLE FOR THIS REPORT WERE:

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Appendix A Consultation Findings

EXECUTIVE SUMMARY

PURPOSE OF THE STUDY

Growing the Parramatta CBD into Sydney's second CBD is a key objective of the City of Parramatta and the NSW Government. The NSW Government's metropolitan planning strategy identifies the retention of a Commercial Core for long-term employment opportunities as an important element for growing the Parramatta CBD.

In October 2015, Urbis prepared a technical report being the *Economic Review – Achieving A-Grade Office Space in the Parramatta CBD* to assess the requirements for attracting additional A-Grade commercial floorspace within the Parramatta CBD and recommending planning responses for City of Parramatta.

Following the Gateway Determination from the NSW Department of Planning and Environment in December 2018, Urbis has been engaged to update the study and review the original recommendations having regard to the conditions set out in the Gateway Determination.

UPDATED FINDINGS

The Government has invested significantly in infrastructure in Parramatta including the recent completion of the new Western Sydney Stadium, construction of the Parramatta Light Rail and commitment to development of the West Metro. These major projects are making Parramatta more attractive and increasing tenant demand with major corporations such as National Australia Bank and QBE committing to office space in the Parramatta CBD and the NSW Government relocating major departments to Parramatta.

The financial realities of A-Grade office development were previously a constraint to development in the Parramatta CBD. Net face rents for A-Grade office space in the Parramatta CBD have increased significantly in the last few years as tenant demand is strong and vacancy rates remain very low. The higher rents and tenant demand has benefited the overall viability of office development in the Parramatta CBD and has been reflected with new projects moving to construction.

Since the original study was completed, the residential market across Sydney has softened with a decline in prices and a slow-down in off-the-plan sales. As such, developers have deferred some residential apartment projects and less developers are looking to use residential development to subsidise office development (as was being proposed in 2015). Furthermore, the announcements relating to improved transport amenity, such as the Parramatta Light Rail and West Metro, have also improved the attractiveness of Parramatta as a CBD location.

RECOMMENDATIONS

The following tables outline the recommendations for attracting A-Grade office space to the Parramatta CBD. The requirements for A-Grade office space that will make new buildings attractive to large tenants are outlined in Table E.1. These large corporate tenants are needed to pre-commit to new buildings to make the developments financially viable. The requirements are based on the Property Council of Australia's *A Guide to Office Building Quality 2012* classifications and Urbis' understanding of tenant demand in the current market.

Table E.2 outlines the planning recommendations to be considered by City of Parramatta to attract A-Grade office space to the CBD. The table includes the justification for the recommendation and how it will address key issues and requirements in the market.

The recommendations in the original study are considered to still be appropriate though it is noted that the slowdown in the residential market means those recommendations targeted at using residential to subsidise office development will not provide a short term boost. These recommendations could still be activated in future market cycles if commercial development viability was to soften relative to residential, as is likely to be the case in the future.

The Gateway Determination includes a condition to *"enable unlimited office premises FSR in the B3 Commercial Core on sites greater than 1,800sq.m. Council may reduce this threshold subject to urban design testing and demonstration of the achievement of appropriate commercial floor plates."*.

Urban design testing undertaken by Council indicates that A-Grade office floorplates of 1,500 sq.m can generally be achieved on sites over 2,500 sq.m subject to site orientation, street frontage and ability to achieve inter-building separation and street frontage setbacks. Urbis has undertaken further testing on floorspace requirements and capacity with unlimited commercial FSRs not required to achieve Council floorspace targets. As such, enabling unlimited office premises FSR in the B3 Commercial Core only on sites greater than 1,800sq.m is supported.

- Allowing unlimited FSR on sites over 1,800 sq.m has the added benefit of encouraging amalgamation of smaller lots that could facilitate the development of A-grade office space. Developing smaller lots has the negative impact of 'quarantining sites' for a long period of time, with a long term view needed to be taken to ensure sufficient large sites to develop A-grade office into the future.
- Over time, some older existing A-grade office buildings are likely to transition to B-Grade buildings as new contemporary office stock is delivered. This is likely to reduce the emphasis needed to facilitate this type of development on smaller sites making it important that opportunities and incentives are provided for new A-grade office space to be developed to maintain sufficient high quality space.
- While it is unlikely that new larger B-grade office development in the Parramatta CBD will occur due to financial viability factors, it is important that planning take a long term view to encourage A-grade space office development.

A-Grade Office Requirements

PARRAMATTA CBD TABLE E.1

Recommendation	Description	Justification
Large floorplates	New A-Grade office space generally needs to have a floorplate size of at least 1,300 sq.m, with most major tenants wanting a floorplate of over 1,500 sq.m. (It is also noted that in some instances tenants are looking for office accommodation with floorplates over 2,000 sq.m, which is more common in locations such as Macquarie Park and in new major development in the Sydney CBD such as Barangaroo).	• Large corporations want to improve the circulation and interaction within their offices. Large floorplates allow businesses to get more workers on the same floor and improve social interaction in the office. Tall and thin towers fail to provide this requirement to tenants • The ability to provide very large floorplate campus style offices is one of the reasons corporate business parks have successfully attracted large corporate offices (combined with relatively affordable rents).
Flexible and accessible floorplates	Large open floorplates that allow for flexible and efficient workspace design and internal circulation. This includes internal stairways to connect adjacent floors and limited internal columns. This also includes preferences to reduce large central cores (with lifts and fire stairs), with a growing preference for side cores.	• Similar to the benefits of large floorplates, tenants want the space to be flexible to allow for the maximisation of circulation and to encourage interaction and collaboration. More companies are moving towards agile work and open planned environments with less private offices • Some traditional offices have a large internal core (with fire stairs and lifts) that fragments the office. Flexible design, such as the use of side cores, can reduce this impact and provide more open workspaces.
High ceiling heights	High ceilings of 2.7 metres and above.	• High ceilings provide a more 'open' workspace that is attractive to workers and tenants. As such, height controls should be flexible for commercial office buildings in order not to stifle optimum floor to ceiling heights.
Good lift service	High quality and high frequency of lifts in the building.	• Tenants require high quality and high frequency lifts to support the circulation of staff • Slow and unreliable lifts can provide a poor impression on the building and tenants.
On site facilities	Provision of end-of-trip facilities within the building such as bike storage, showers, change rooms and lockers to support people taking active transport to work.	• A larger proportion of workers are taking active forms of transport to work such as cycling, jogging and walking. On-site facilities improve the amenity and make it easier for building tenants to attract and retain staff.

Recommendation	Description	Justification
Amenity	Access to local amenities including retail, dining options, public space, recreation facilities and other personal services. A corporate setting within a vibrant commercial centre that includes other successful businesses.	• Major corporations want to be located in an area with amenities that is attractive to their staff including access to retail, food, recreation and other services • Tenants want to be located in a location that matches their corporate image and do not want to be surrounded by poor quality buildings and apartments with 'washing on display'. Adjoining buildings whether they be commercial or residential need to be of a similar high standard and well managed.
Environmental	4 Star Green Star Design Rating including 4.5 Star NABERS Office Energy rating commitment.	• The Property Council of Australia's *A Guide to Office Building Quality 2012* classifies A-Grade office space as at least meeting these environmental standards. Most large corporations are conscious of their environmental footprint and look to move into more energy efficient buildings where possible.

Recommendations

PARRAMATTA CBD TABLE E.2

Recommendation	Description	Justification
Office as predominant use in Commercial Core.	Reaffirm office development as the predominant use in the Commercial Core though allow residential apartment development by exception under certain circumstances (see recommendations below). It is recommended that controls promote A-Grade office buildings of at least 20,000 sq.m and be informed by planning, design and heritage considerations. Buildings less than 20,000 sq.m should not be prohibited as some sites may have constraints that limit achievable size.	• Most successful CBDs successfully integrate commercial office development with residential apartments to create a vibrant commercial district. While it is important that the Parramatta CBD support a Commercial Core that is predominantly office uses, there is considered to be a place for residential as part of horizontal mixed use developments. Allowing residential development also has the benefit of helping to facilitate viable office development during market cycles where residential can provide a higher relative return. • The last four A-Grade office buildings developed in the Parramatta CBD have all been over 20,000 sq.m with a floorplate of over 1,300 sq.m. It is considered that large A-Grade office buildings of over 20,000 sq.m need to be promoted for the Parramatta CBD to transition into a major CBD of metropolitan significance • This may be integrated with the minimum office FSR that allows alternative complementary mixed-use development if a significant minimum A-Grade office component is provided.
Subject to planning, design, and heritage considerations, potentially allow horizontal mixed use development in the Commercial Core subject to net additional A-Grade office space of over 20,000 sq.m on the site. Recommended to be considered only if the	Allow a separate residential apartment building to be built on a site where there is the net additional development of A-Grade office space of over 20,000 sq.m. It is recommended that the potential of the strategy be informed by planning, design and heritage considerations to determine the number of sites that can accommodate such development. Note: See Glossary for definitions of vertical and horizontal mixed-use development.	• It is recommended that the potential mixed-use developments be limited to larger sites that have the capacity to maintain a minimum unconstrained A Grade office floor plate of 1,500 sq.m. This is important in maintaining the quality of new A-Grade accommodation in the Parramatta CBD into the future • Council to consider planning, design and heritage factors to determine the number of sites capable of accommodating a horizontal mixed-use development of this nature, particularly where separate residential and office towers can be constructed on one site • While there are only a few sites of a size and nature that can viably accommodate a horizontal mixed-use development with separate office and residential buildings, they represent an opportunity to facilitate development during market cycles where residential is more viable than office development. Applying this recommendation is not considered necessary at present given the current strength of the commercial office market. However, should the commercial office market soften in the future, Council

Recommendation	Description	Justification
relative viability of office development deteriorates.		could consider implementing this recommendation through individual site-specific planning proposals that could accommodate horizontal mixed-use development.
Subject to an adequate number of suitable sites being identified in the Commercial Core for horizontal mixed-use development, consider implementing a residential development cap. Recommended to be considered only if the relative viability of office development deteriorates.	Implementing a cap on the amount of residential floorspace that can be developed in the Commercial Core (subject to adequate sites in the Commercial Core being identified for horizontal mixed-use development).	• The residential market in Parramatta has softened in the last two years from the boom during 2013 to 2017 with office development becoming more viable compared to residential apartments. If the relative viability was to return to previous levels, the implementation of an initial cap may have the added benefit of facilitating development of A-Grade office space during office downturns as developers look to take advantage of the opportunity before it is exhausted. Council also has the option to review the cap at certain development thresholds to determine if it is appropriate to extend the scheme. • A residential development cap would allow a maximum amount of residential floorspace to be developed within the Commercial Core. This would have the benefit of allowing residential development in the Commercial Core to help facilitate the development of A-Grade office space in certain market conditions. At the same time, the cap would limit the total amount of residential space that could be developed and ensure that employment uses remain the primary use in the Commercial Core • A residential development cap is considered to be easier to administer compared to transferable development rights • This is subject to adequate sites being identified as suitable to accommodate horizontal mixed-use development.
Remove maximum FSR and height controls for office development that achieve floorplates of 1,500 sq.m.	Remove maximum FSRs for A-grade commercial office development in the Commercial Core and be more flexible on allowable building heights for commercial development.	• Maximum FSRs are considered to be relatively arbitrary. If a developer is willing to develop a large A-Grade office (with floorplates of over 1,500 sq.m) that exceeds maximum FSRs, it is considered that it should be supported provided that it can meet other design and impact requirements. While it is unlikely to have a major impact on office viability in the short to medium term, there is considered to be value in increasing flexibility in the long term • This recommendation aligns with the Parramatta CBD Planning Strategy, which recommends non-residential floorspace above the minimum requirement not count towards the site FSR

Recommendation	Description	Justification
		• More flexible building heights, that still comply with Obstacle Limitation Surface (OLS) requirements around Sydney airspace, will encourage developers to maintain greater ceiling heights, which is attractive to large A-Grade tenants
Applying maximum FSR for small lots.	Only allow unlimited office space in the B3 Commercial Core for those sites over 1,800 sq.m to promote site amalgamation.	• The trend in office development in recent years has been towards buildings with larger floorplates over 1,300 sq.m (and generally over 1,500 sq.m) that allow tenants to take fewer floors and improve staff interaction. Small sites should be offered incentives to amalgamate to help facilitate developments that are desired by the market and achieve economic development outcomes • Urban design testing by Council has indicated that sites of over 2,500 sq.m are generally required to achieve floorplates of 1,500-1,800sq.m subject to site orientation, street frontage and ability to achieve inter-building separation and street setbacks. • Developing smaller lots has the negative impact of 'quarantining sites' for a long period of time, with a long term view needed to be taken to ensure sufficient large sites to develop A-grade office. Over time, some older existing A-grade office buildings are likely to transition to B-Grade buildings, which results in an ongoing diverse supply of office space opportunities and levels of affordability, making it important that new A-grade office space is developed to maintain sufficient high quality space.
Complementary design code for residential uses.	Develop built form controls so that any residential development in the CBD area is of a 'commercial aesthetic'.	• The design of some mixed-use residential developments around the Commercial Core is becoming inconsistent with the intention to promote Parramatta CBD as an employment destination and encourage the supply of A-Grade office space. External balconies that are cluttered in appearance or that do not reflect the surrounding commercial aesthetic are not attractive to large corporate businesses that want to be located in a commercial environment that aligns with their corporate image • Design controls should be set with a high design benchmark and outline the requirement for residential to include a commercial aesthetic that is complementary to office development, particularly if residential development is to be considered in the Commercial Core in exceptional circumstances (see the recommendations above).

Recommendation	Description	Justification
Expansion of Commercial Core.	Expand the Commercial Core to create a more cohesive commercial precinct and integrate key commercial nodes. Includes connecting the existing core to the Justice Precinct and Westfield Parramatta.	• The existing Commercial Core is generally focussed around the Parramatta Train Station and the area directly to the north. However, there are nodes such as the Justice Precinct that have developed into key office precincts, though they are separated from the existing core • In addition, Westfield Parramatta and Parramatta Square have been identified as having potential to accommodate significant A-Grade office space. • It would be considered beneficial to have a single contiguous commercial core and that areas such as the Church Street dining precinct be protected by relevant heritage and solar access provisions, whilst providing some surety and clear positioning for areas such as the Justice Precinct as a key commercial area.
Auto Alley Precinct.	Continue to encourage non-residential employment generating land uses in the Auto Alley Precinct.	• The Auto Alley Precinct represents an opportunity to facilitate mixed-use development though is not considered likely to attract A-Grade office development in the short-medium term as the majority of new office development will be focused around the Parramatta Train Station and the commercial core north of the rail line. We also acknowledge that the Auto Alley Precinct has constraints due to the bisection by the highway and constrained walkability and connection to existing transport and commercial nodes. In addition, if the potential quality of residential development in Auto Alley is not of a high standard with a style that is not consistent with the required commercial character, this may deter potential A-Grade tenants • It is considered there may be opportunities for A-Grade office space in the long term, once other more attractive areas have been developed, though is not likely to be attractive or financially viable in the current market • It is considered that smaller office and other employment generating uses such as car showrooms represent a good employment generating outcome in the short-medium term.

INTRODUCTION

PROJECT BACKGROUND

Growing the Parramatta CBD into Sydney's second CBD is a key objective of the City of Parramatta, Greater Sydney Commission and the NSW Government. As outlined in "*Central City District Plan*" part of the planning strategy is to increase the capacity for more A-grade office space in Parramatta CBD which will allow new knowledge-intensive jobs therefore strengthening the metropolitan centre.

An objective of Council's "Parramatta CBD Planning Strategy", adopted in April 2015, is to establish principles and actions to guide a new planning framework for the Parramatta CBD. This included investigating the potential to allow residential apartments within certain areas of an expanded Commercial Core as part of mixed use developments, with the key objective being to facilitate more commercial development.

In October 2015, Urbis prepared a technical report being the *Economic Review – Achieving A-Grade Office Space in the Parramatta CBD* to support the Parramatta CBD Planning Proposal. Following the Gateway Determination from the NSW Department of Planning and Environment in December 2018, Urbis has been engaged to update the study and review the original recommendations, having regard to relevant conditions from the Gateway Determination and how the office market has changed over the past four years since the original study was prepared.

PURPOSE OF THE STUDY

The purpose of the study is to assess the requirements for attracting additional A-Grade commercial floorspace within the Parramatta CBD. Key components of the study comprise:

- Assessing the current state of the Parramatta CBD office market
- Identify the key drivers of the office market and implications for attracting new development and tenants
- Evaluate the implications of permitting residential development on the delivery of commercial development (particularly A-Grade office space) in the commercial core of the Parramatta CBD
- Assess whether residential development should be permitted within the commercial core
- Respond to the Government's requirement in the "Central City District Plan" to increase capacity for more A-Grade commercial floorspace in Parramatta CBD for long-term employment growth.

GLOSSARY

Building costs – include statutory and operating expenses. Statutory expenses often include insurance, municipal rates, water and sewerage rates. Operating expenses include land tax, building supervision, cleaning, repairs and maintenance.

Transport Performance and Analytics (TPA) – NSW Government agency that compiles transport related statistics and prepares projections (formerly NSW Bureau of Transport Statistics).

Central Business District (CBD) – commercial and business centre of a city.

Floorplate – rentable area of an entire floor.

Floor Space Ratio (FSR) – ratio of the gross floor area of a building divided by the total land area of the property.

Gross face rent – rental rate inclusive of all building costs and including the value of incentives which have the effect of inflating the rent.

Horizontal Mixed Used Development – means residential and commercial/office development in separate buildings constructed on the one site.

Incentives – inducements (usually financial) offered by landlords to attract tenants. Examples include rent free periods, rental abatement and contribution to tenant fitout.

National Australian Built Environment Rating System (NABERS) – national rating system that measures the environmental performance of Australian buildings, tenancies and homes. It takes into account the energy efficiency, water usage, waste management and indoor environment quality of a building or tenancy and its impact on the environment.

Net absorption – occupied office stock at the end of the survey period less occupied stock at the beginning of the period. Net absorption is used as an indication of the change in office demand during a period of time.

Net effective rent – rental rate excluding building costs after taking into account the value of incentives paid to the tenant over the term of the lease.

Net face rent – rental rate excluding building costs but including the value of incentives which have the effect of inflating the rent.

Net lettable area (NLA) – floor space that may be rented to tenants. It excludes external walls, building cores and standard service areas such as toilets, access passageways, storerooms etc.

Office Market Report (OMR) – a database which contains information about the total stock, vacancy, supply, withdrawals and absorption of 25 office markets across Australia. It is updated by the Property Council of Australia every six months.

Property Council of Australia (PCA) – industry organisation that advocates for Australia's property sector.

Vertical Mixed Use Development – means residential apartments or other non-office use such as hotels developed above or below commercial/office space in a single building tower.

1. PLANNING CONTEXT

This section provides an overview of the planning context for the project including a review of key State Government and City of Parramatta reports relevant to the future development of office space in the Parramatta CBD.

1.1. A METROPOLIS OF THREE CITIES

A Metropolis of Three Cities outlines the NSW Government's framework for planning for the future of three cities in Metropolitan Sydney. A key direction of the Plan is to grow Parramatta as Sydney's second CBD with elements of the goal including:

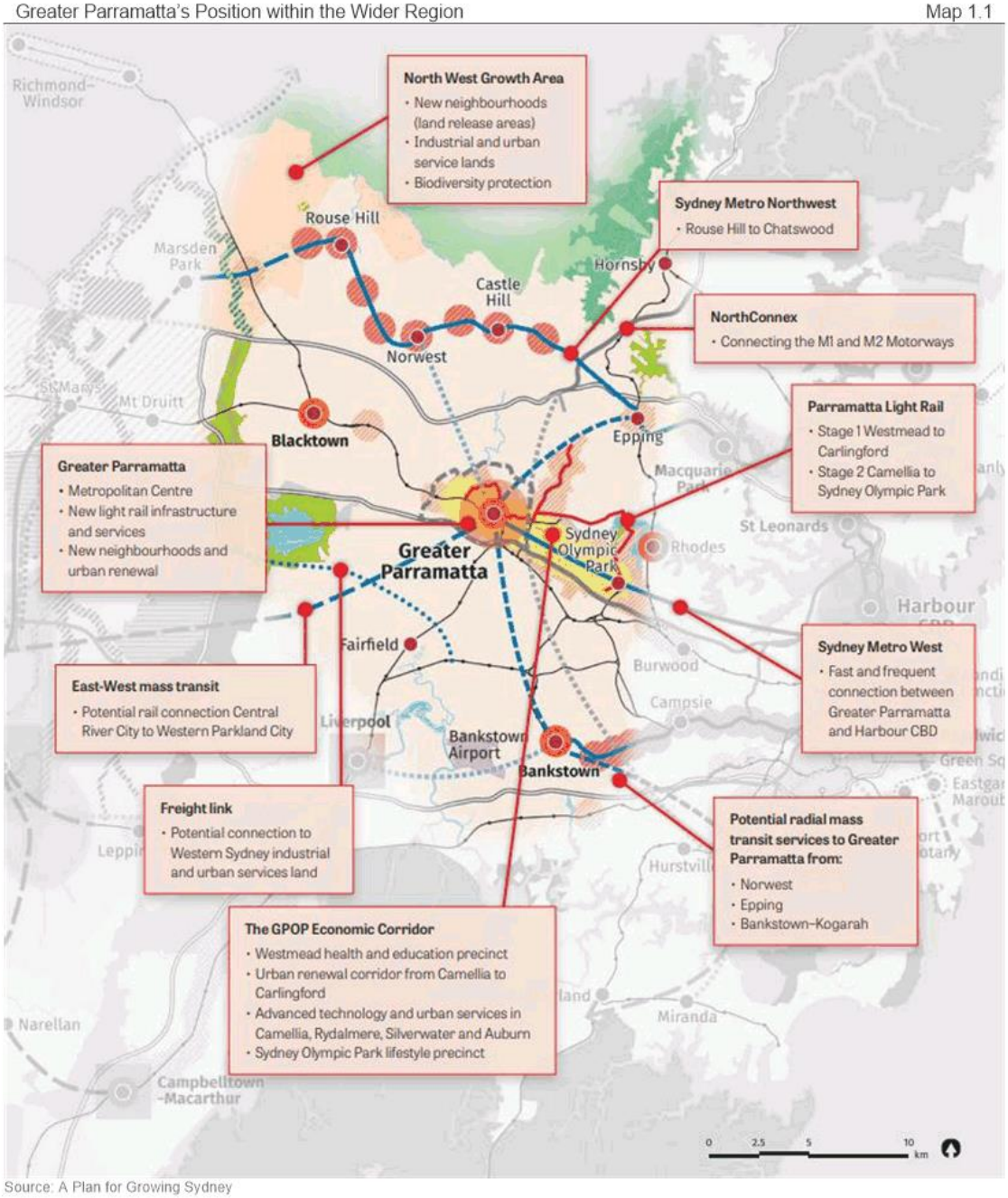
- Grow Parramatta as Sydney's second CBD by connecting and integrating Parramatta CBD, Westmead, Parramatta North, Rydalmere and Camellia. This includes the development of the Parramatta light rail to better integrate the different precincts
- A vision where most residents live within 30 minutes of their jobs, education and health facilities, services and great places
- *"Increase the capacity for new jobs and dwellings to create a dynamic and diverse city."*
- *"Strengthen opportunities for the provision of high quality commercial floor space."*
- *"Strengthen Parramatta's position as the dual CBD for Metropolitan Sydney."*

Greater Sydney Commission have also prepared strategy documents for each district. The *Central City District Plan* outlines a vision to develop the Central River City.

Key recommendations from the *Central City District Plan* to council include:

- Strengthen the economic competitiveness of Greater Parramatta
  - Promote opportunities to develop more office space
  - Balancing residential development with commercial development
  - Provide for a diverse and vibrant night-time economy.
- Public transport investment to improve the connectivity of Greater Parramatta to other strategic centres such as the Harbour CBD, Western Sydney Airport-Badgerys Creek Aerotropolis, Sydney Olympic Park, Westmead, Macquarie Park, Norwest and Kogarah
- Manage congestion and identify smart traffic management strategies.

Greater Parramatta's Position within the Wider Region Map 1.1



Source: A Plan for Growing Sydney

The NSW Department of Planning and Environment forecasts Greater Parramatta to reach more than 55,000 additional jobs over the next 20 years. It should be noted that this number is expected to rise with infrastructure increases and as the area develops. Transport Performance and Analytics data forecasts Parramatta CBD to accommodate an additional 34,500 jobs over the next 20 years, making up a significant proportion of the growth within Greater Parramatta.

Parramatta CBD Growth Forecasts

2016-2036 TABLE 1.1

Component	2016	2036 Forecast	Growth (2016-36)
Jobs	51,100	85,600	34,500
Dwellings	8,511	20,812	12,301

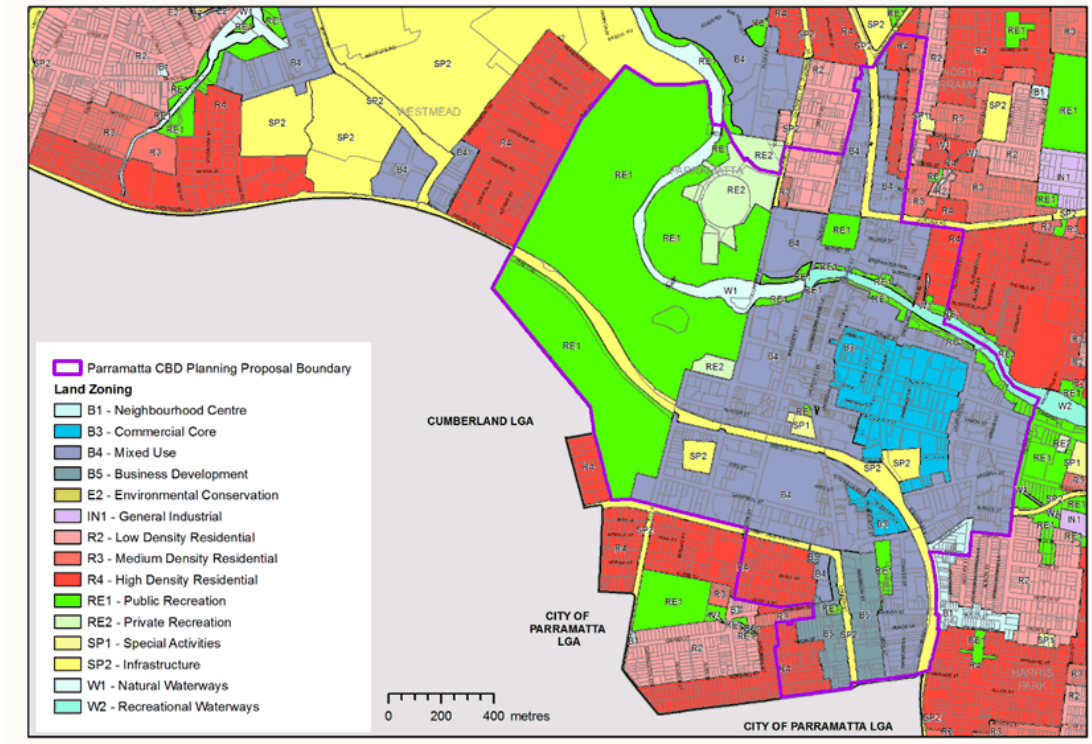
Source: TPA, Urbis

1.2. CURRENT PARRAMATTA CITY CENTRE PLANNING CONTROLS

Planning controls for the Parramatta City Centre are outlined in the *Parramatta Local Environmental Plan 2011* including:

- Zoning: There are three commercial land use zones in the city centre comprising B3 Commercial Core, B4 Mixed Use and B5 Business Development under the *Parramatta Local Environmental Plan 2011*. Residential development is currently prohibited in both the B3 Commercial Core zone and B5 Business Development zone.

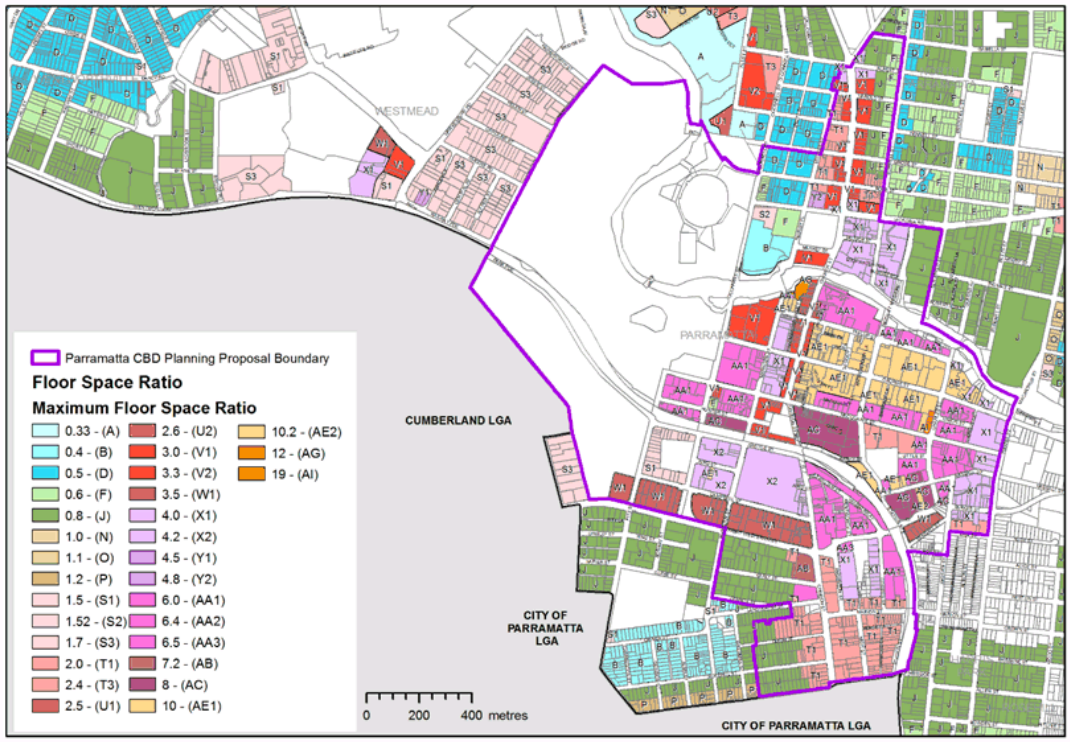
Parramatta CBD Zonings – 2 September 2019 Map 1.2



Source: City of Parramatta

- Floor Space Ratio: Generally, the core area bordered by Phillip Street, Church Street, Macquarie Street and Charles Street has a FSR of 10:1, except for the areas fronting Church Street and Macquarie Street.

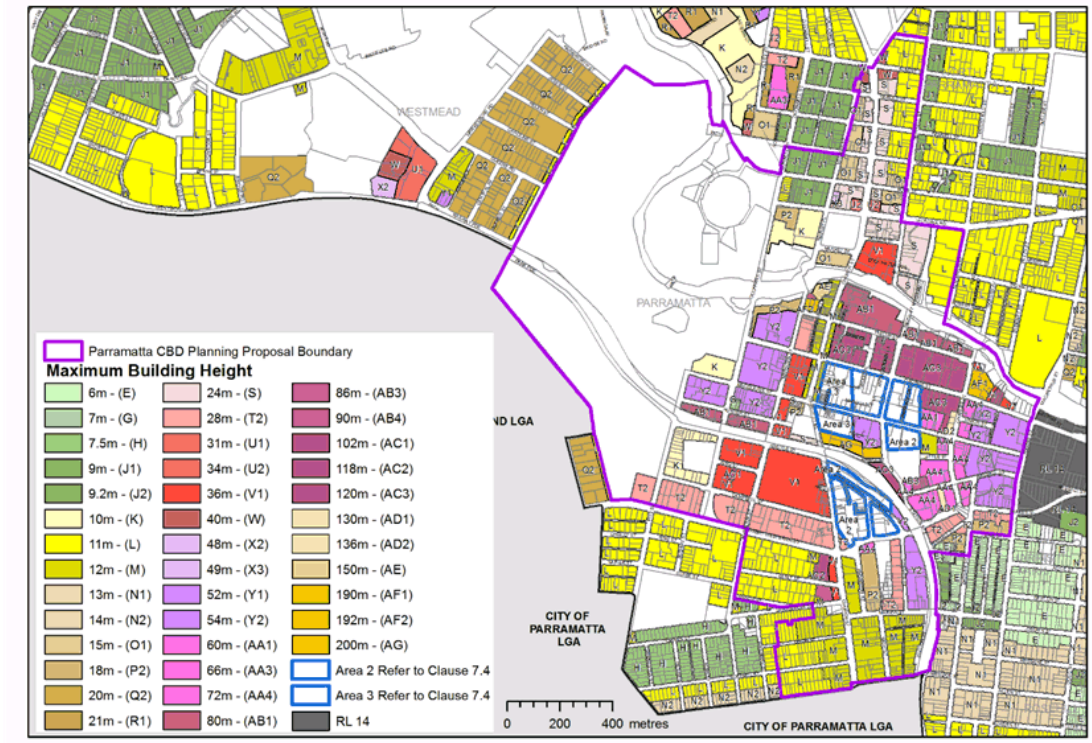
Parramatta CBD Maximum Floor Space Ratios – 2 September 2019 Map 1.3



Source: City of Parramatta

- Building Heights: Building height controls in the City Centre generally range up to 200m. Walker Corporation is developing 6 & 8 Parramatta Square with a building height of up to 230m.

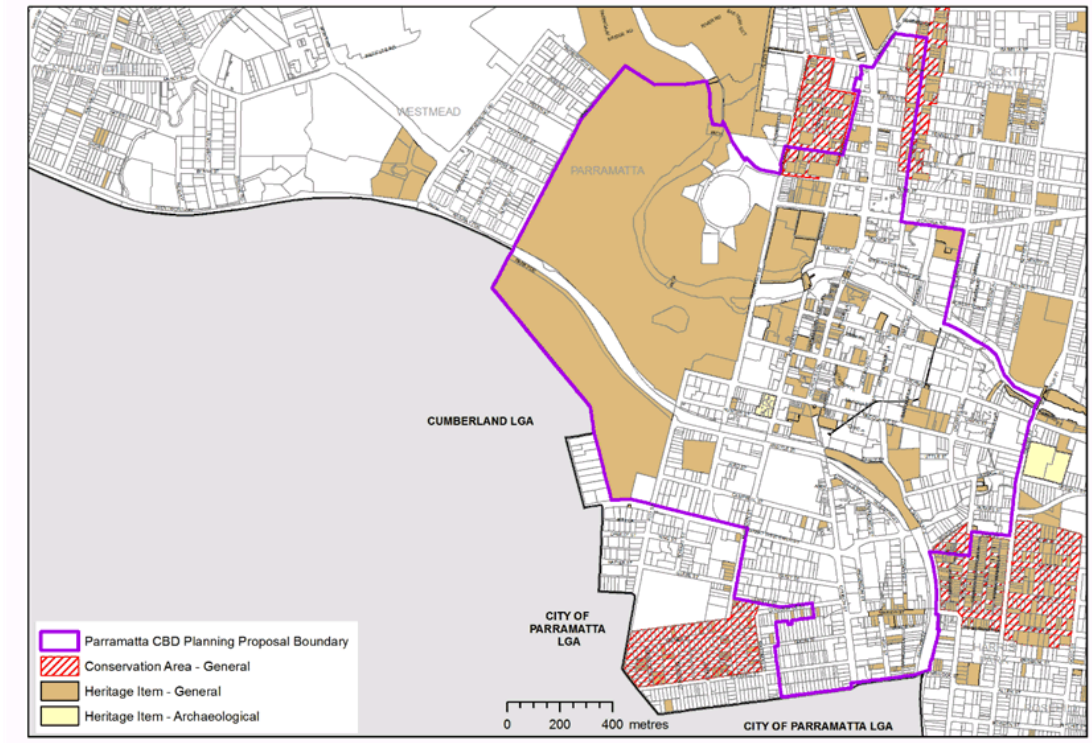
Parramatta CBD Maximum Building Heights – 2 September 2019 Map 1.4



Source: City of Parramatta

- Heritage: Parramatta has a long history, which has resulted in significant heritage buildings throughout the CBD. Old Government House is listed as a World Heritage Site, which places constraints on what can be developed on the western side of the Parramatta CBD.

Parramatta CBD Heritage Items – 2 September 2019 Map 1.5

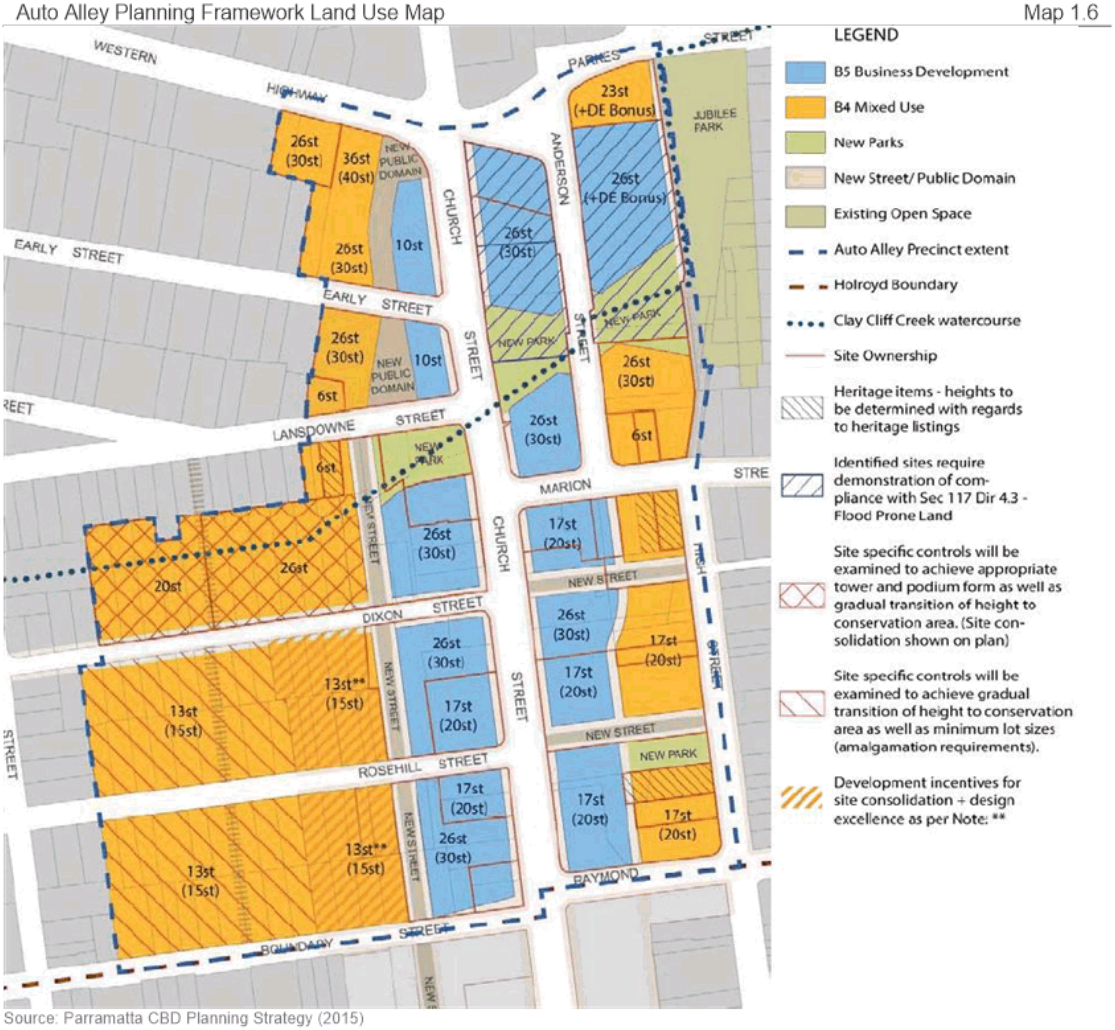


Source: City of Parramatta

1.3. DRAFT AUTO ALLEY PLANNING FRAMEWORK (2014)

Council prepared a study for future development in the Auto Alley Precinct (forming the southern portion of the CBD). The Auto Alley Study is the result of several years of work and includes detailed urban design analysis. The framework recommends the development of commercial space fronting Church Street with the allowance for residential development towards the back of the site. The Draft Auto Alley Planning Framework has been integrated into the Parramatta CBD Planning Strategy, as shown in the figure below.

Auto Alley Planning Framework Land Use Map Map 1.6



Source: Parramatta CBD Planning Strategy (2015)

1.4. PARRAMATTA CITY CENTRE PLANNING FRAMEWORK STUDY (2014)

Council engaged consultants (Architectus and SGS Economics and Planning) to prepare a study for future development in the Parramatta CBD. The objective of the study was to review the current planning framework and identify opportunities, constraints and market conditions impacting on development, and from this develop draft planning controls and recommendations.

Key findings relating to the Parramatta CBD included:

- Parramatta has been experiencing competition from centres such as North Ryde, Norwest and Sydney Olympic Park as they provide greater opportunity for larger floorplate and campus-style developments than the Parramatta CBD
- In the short term, Parramatta is unlikely to attract many large commercial office buildings (e.g. greater than 30,000 sq.m) due to the limited scale of growth in the office market and need for high proportions of pre-commitment before office developments get off the ground, and competition from other centres.

Key recommendations to Council included:

- On the balance of evidence, to continue to exclude residential development from the Commercial Core zoned areas of the CBD based on a perceived limited capacity in the core for employment growth and there being capacity for residential development in mixed-use zoned areas of the CBD
- A slightly riskier but relatively conservative approach would be to allow 'multiple use developments' in the Commercial Core, but implement a very high threshold requirement for non-residential floorspace (e.g. a minimum of 20,000 or 30,000 square metres) before residential development might be added to the development proposition.
- Mechanisms and/or incentives for providing commercial floorspace in mixed use zoned areas should be contemplated to maximise the capacity for employment. These might include:
  - Requirements for a minimum of proportion of commercial floorspace
  - Incentives to provide retail and commercial floorspace such as FSR exceptions, reduced parking requirements, rate rebates for commercial floorspace, or other financial inducements.
- Consideration to the potential to accommodate employment growth in other locations in the Greater Central Parramatta including the Auto Alley precinct and employment lands in Greater Parramatta (including Westmead, Rydalmere, Camellia and Granville)
- Lobbying and facilitating improved transport links to improve access to potential labour markets relative to other centres and enhance the prospects of attracting additional employment to the Parramatta CBD.

In 2016 City of Parramatta prepared a planning proposal to outline the growth and development of the Parramatta CBD. In November 2018, a gateway assessment was prepared to review the strategic merits of the planning proposal.

Key findings in the planning proposal and gateway assessment included:

- Parramatta CBD has a clearly defined and zoned commercial core which is surrounded by a mixed-use zone that supports commercial and residential development. There are also pockets of land zoned R4 High Density Residential and R3 Medium Density Residential within the boundary of the CBD planning proposal
- Parramatta CBD contains many significant heritage items of world, national, state and local significance
- The planning proposal seeks to expand the boundaries of the Parramatta CBD primarily at the northern and southern periphery.

1.5. PARRAMATTA CBD PLANNING STRATEGY (2015)

Overview

In 2015 the former Parramatta City Council integrated the *draft Parramatta City Centre Planning Framework Study (2014)* and the *draft Parramatta Auto Alley Planning Framework Study (2014)* into one document: *Parramatta CBD Planning Strategy (2015)*. The Planning Strategy is effectively a consolidation of the recommendations in the CBD and Auto Alley studies and also reflects previous Council resolutions. The Planning Strategy was adopted by Council on 27 April 2015.

The objectives of the Strategy comprise:

1. To set the vision for the growth of the Parramatta CBD as Australia's next great city
2. To establish principles and actions to guide a new planning framework for the Parramatta CBD
3. To provide a clear implementation plan for delivery of the new planning framework for the Parramatta CBD.

The *Parramatta CBD Planning Strategy* sets the direction for the project and details the 'Actions' that will inform a future Planning Proposal to amend the planning controls for the CBD. Key actions in the strategy include the following:

- Investigate the potential expansion of the CBD boundary
- Conduct feasibility testing to increase FSRs to predominantly 10:1 and 6:1 across the CBD
- Only allow FSRs greater than 3:1 for those sites over 1,000 sq.m (or smaller sites that demonstrate design excellence)
- Investigate removal of any height controls, except in some key areas
- Investigation of potential sun access controls to key public spaces
- Investigate expansion of the commercial core, and potentially opening parts of the core up to some residential uses (subject to significant commercial floorspace being provided in the first instance)
- Setting an employment growth target of 27,000 additional jobs and residential growth target of 7,500 additional dwellings by 2036 for the CBD
- Detailed investigation of infrastructure needs, including funding mechanisms
- Promotion of tower slenderness and design excellence.

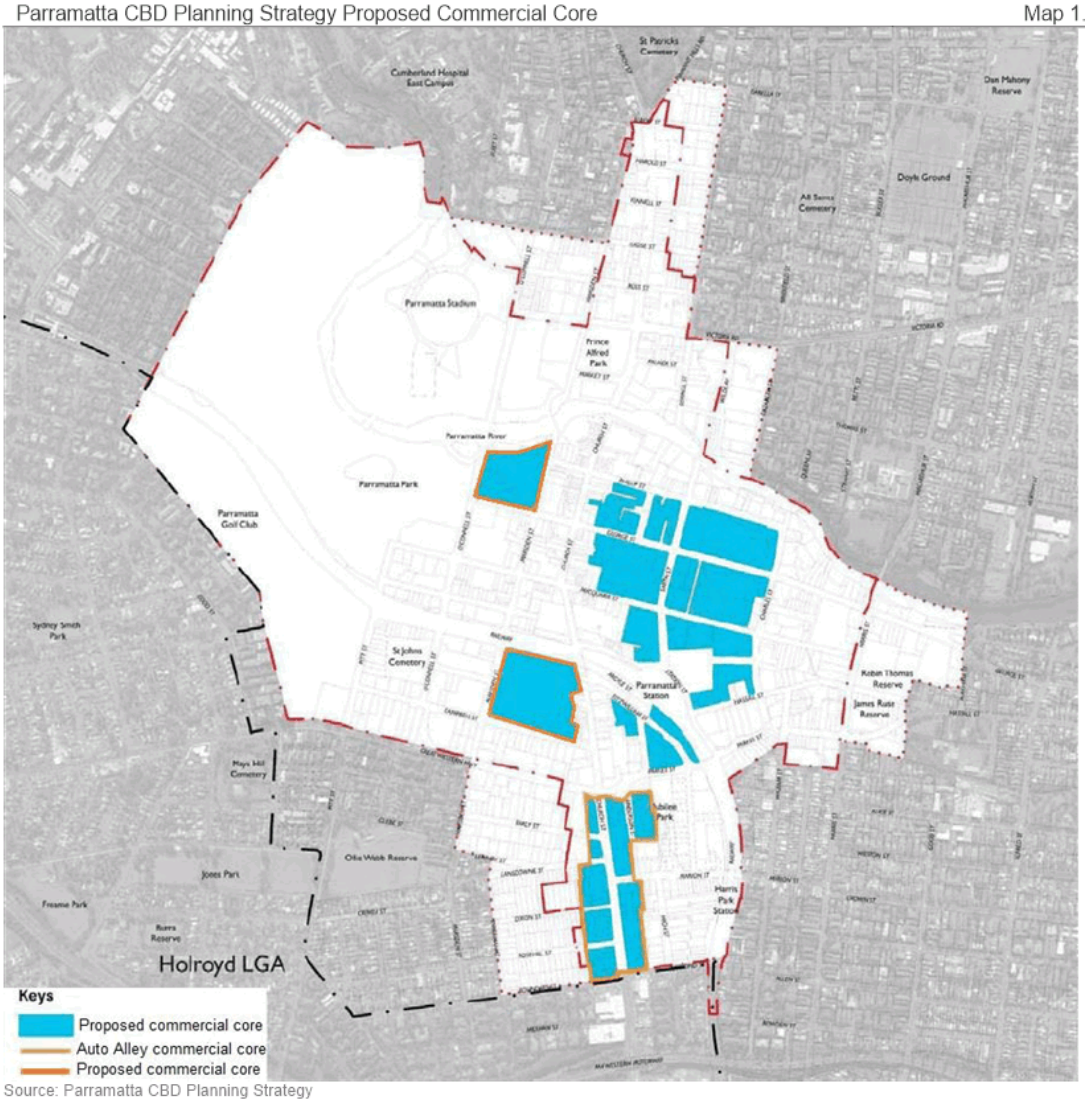
Key Actions Relevant to Study

The following actions are considered to be most relevant to facilitating the development of A-Grade Office Space in the Parramatta CBD:

- Investigating the expansion of the commercial core with additional areas outlined in Map 1.7 and comprising:
  - Parramatta Justice Precinct
  - Parramatta Square (eastern end)
  - Westfield Parramatta
  - Auto Alley.

- Investigate the potential for residential uses in the Commercial Core, other than in the Auto Alley precinct (where high density will be permitted directly adjacent to the Core), subject to the following conditions being met:
  - A significant quantum of office space (a **minimum of 20,000 sq.m**) is built before residential occupation of a development site
  - Sites deliver primarily employment uses (**50% or more of floorspace is employment generating**)
  - **Non-residential FSR exceeding the minimum requirement above is exempt** from the maximum FSR to provide incentives to encourage more commercial development.
- Subject to urban design testing, **a minimum non-residential FSR of 1:1 must be achieved** for all sites in the mixed use zone of the Parramatta CBD. **Non-residential FSR exceeding this minimum requirement should be exempt** from the overall maximum FSR for mixed use zones. This effectively provides a bonus to developers for providing non-residential floorspace in excess of the minimum 1:1.

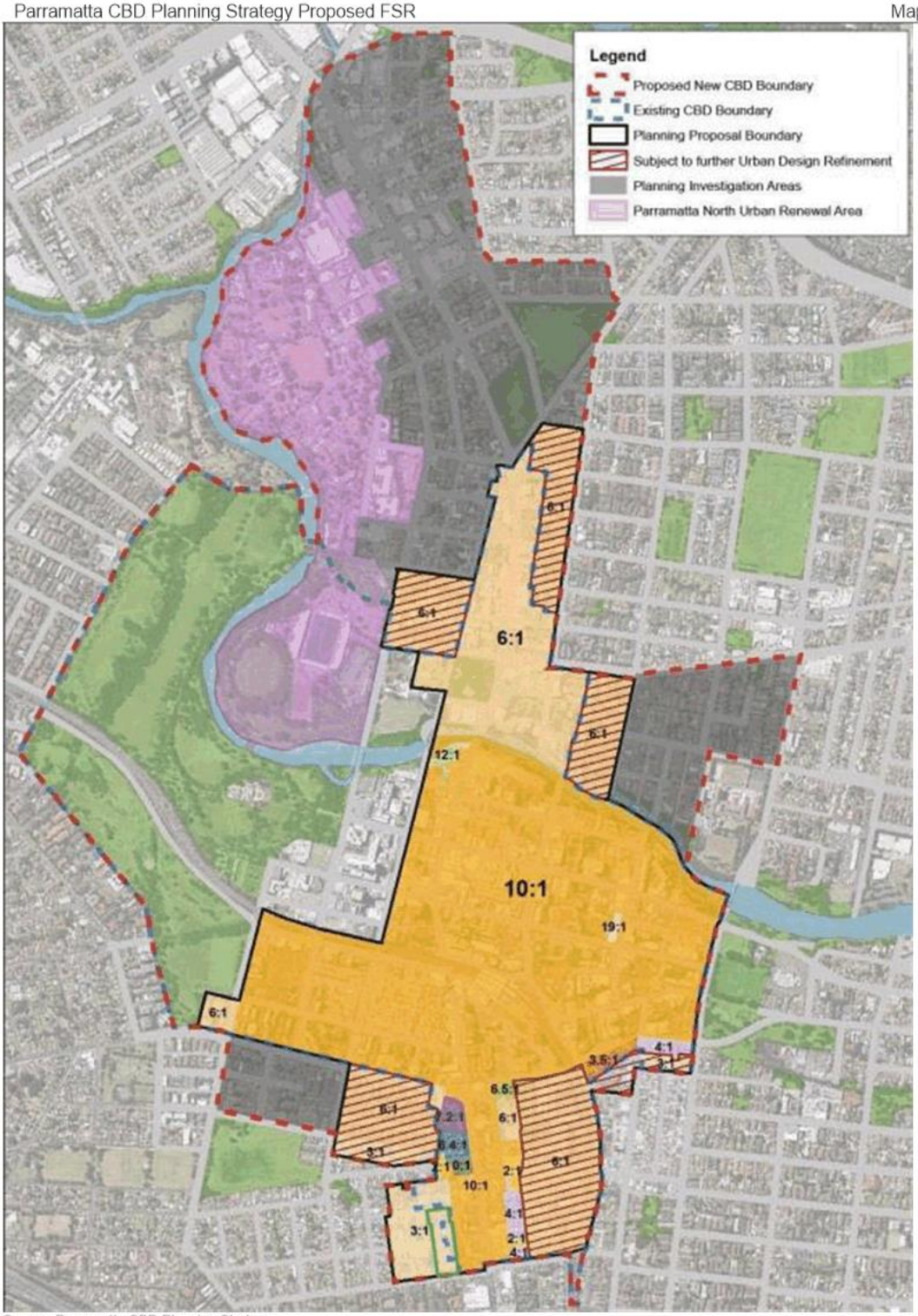
Parramatta CBD Planning Strategy Proposed Commercial Core Map 1.7



Source: Parramatta CBD Planning Strategy

- Conduct feasibility testing to increase FSRs to predominantly 10:1 and 6:1 across the CBD (See Map 1.8).

Parramatta CBD Planning Strategy Proposed FSR Map 1.8



Source: Parramatta CBD Planning Strategy

2. PARRAMATTA CBD OFFICE MARKET

This section analyses the current and historical performance of the Parramatta CBD office market including proposed developments.

2.1. OFFICE BUILDING CLASSIFICATION

The Property Council of Australia (PCA) classifies office buildings according to criteria which influence a building's ability to attract occupants and sustain rental performance. Key criteria include building quality, size, floorplate, environmental rating, lifts, amenity and services as outlined in the *A Guide to Office Building Quality 2012*. The third edition of the report is due to be released in late May 2019. The key classifications and criteria for the assessment of new office buildings comprise:

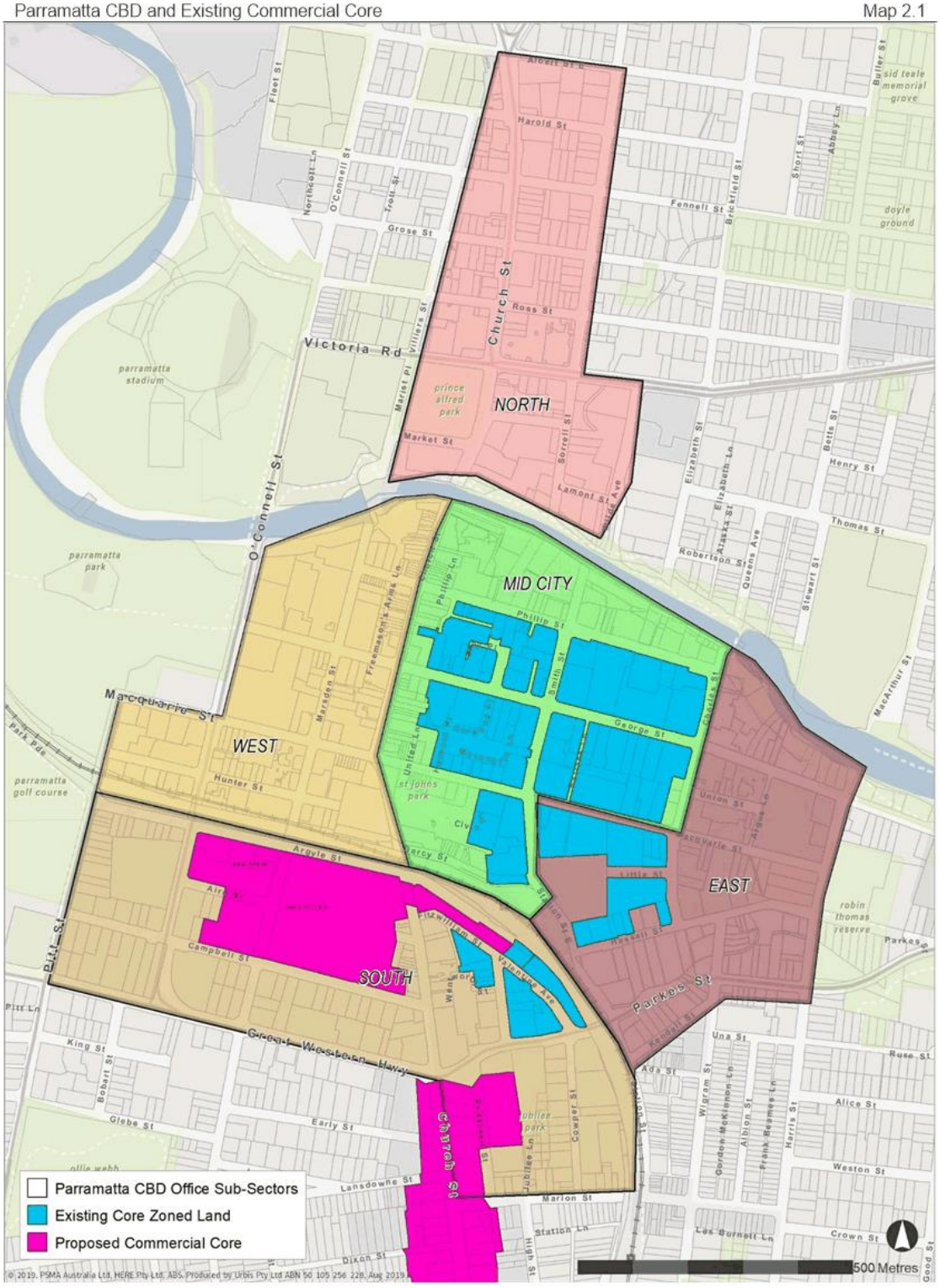
- **Premium grade office buildings** are landmark office buildings with expansive views or outlook, ample natural lighting, prestige lobby and finishes, high quality access from an attractive street setting and premium maintenance.
  - >30,000 sq.m in Sydney/Melbourne/Brisbane/Perth CBDs and >20,000 sq.m in other CBDs
  - Floorplate > 1,500 sq.m Sydney/Melbourne/Brisbane/Perth CBDs and >1,200 sq.m in other CBDs
  - Full building management control systems (BCMS)
  - Lifts (it is noted there are specific performance requirements for lifts that apply to all classifications with different service requirements for different classifications)
  - Management onsite for buildings >30,000 sq.m
  - Security with CCTV systems
  - Change rooms and showers
  - Carpark with loading docks or delivery bays
  - 5 Star Green Star Design Rating including 5 Star NABERS Office Energy rating commitment.
- **A-Grade office buildings** are high quality with good views, outlook and natural light, good quality access from an attractive street setting and high quality maintenance.
  - >10,000 sq.m in Sydney/Melbourne/Brisbane/Perth CBDs and >5,000 sq.m in other CBDs
  - Floorplate > 1,000 sq.m Sydney/Melbourne/Brisbane/Perth CBDs and >800 sq.m in other CBDs
  - Full building management control systems (BCMS)
  - Lifts
  - Management onsite for buildings >30,000 sq.m
  - Security with CCTV systems
  - Change rooms and showers
  - Carpark with loading docks or delivery bays
  - 4 Star Green Star Design Rating including 4.5 Star NABERS Office Energy rating commitment.
- **B-Grade office buildings** are quality office space with a good standard of finish and maintenance.
  - >6,000 sq.m in Sydney/Melbourne/Brisbane/Perth CBDs and >3,000 sq.m in other CBDs
  - Floorplate > 700 sq.m Sydney/Melbourne/Brisbane/Perth CBDs and >600 sq.m in other CBDs
  - Building management

  - Electrical and mechanical minimum requirements
  - Security with CCTV systems
  - 4 Star Green Star Design Rating including 4 Star NABERS Office Energy rating commitment.
- **C-Grade office buildings** are average quality space with lifts
- **D-Grade office buildings** are poor quality space not accommodated in the other categories.

2.2. PARRAMATTA CBD

The following map outlines the Parramatta CBD as defined by the PCA as part of their Office Market Report. The Parramatta CBD is considered to comprise five sub-sectors with the current Commercial Core zoned land primarily located within the Mid City and East precincts. The proposed extension to the Commercial Core along Auto Alley may extend the South Precinct in the longer term.

Parramatta CBD and Existing Commercial Core Map 2.1

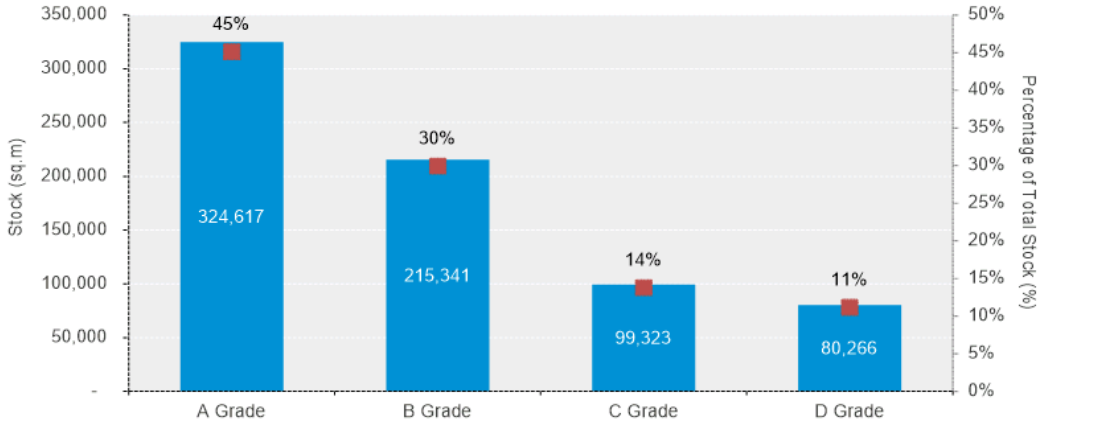


2.3. EXISTING SUPPLY

Chart 2.1 outlines the breakdown of office stock as of January 2019. The Parramatta CBD has a total office stock of 719,547 sq.m as at January 2019. A-Grade office stock accounts for 45% while B-Grade office stock accounts for 30% of the total stock.

Office Stock by Grade

Parramatta CBD, January 2019 Chart 2.1

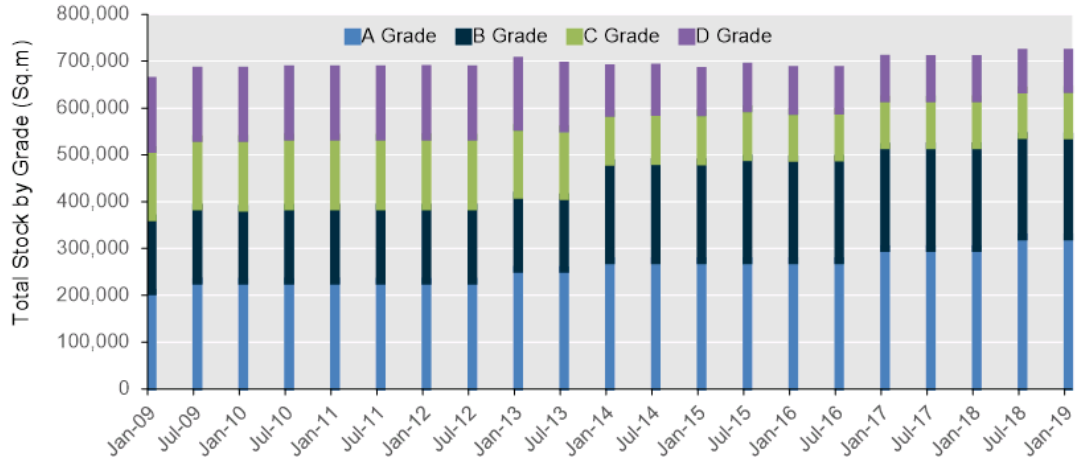


Source : PCA Office Market Report January 2019 ; Urbis

The following chart outlines the historical growth in office space in the Parramatta CBD over the last 10 years. Total office space has increased from around 660,000 in January 2009 to 720,000 in January 2019. It is noted that there was a reclassification of office space in January 2014, with the increase in A-Grade and B-Grade space at the expense of lower grade stock. The 105 Phillip Street project was the last project completed in 2018.

Historical Office Stock by Grade

Parramatta CBD January 2009 to January 2019 Chart 2.2



Source: Property Council of Australia; Urbis

Table 2.1 outlines the completion year, floorplate size, net lettable area and key tenants of the largest office buildings in Parramatta CBD. Developments over the last decade include:

- 105 Phillip Street: a 14 storey office building that was completed in 2018 with 24,953 sq.m of office space. It features a ground floor retail with 658 sq.m and floorplates ranging from 1,400 to 1,873 sq.m
- 1PSQ: Located at 169 Macquarie Street, Parramatta to the north of the train station. The 15 storey commercial tower was completed in 2016 with a total net lettable area of 26,498 sq.m and an average floorplate of 1,400 – 2,200 sq.m. Western Sydney University took a 15-year lease over the building
- Eclipse Tower: Located at 60 Station Street East, Parramatta towards the south-east of the Parramatta CBD. The 20 storey A-Grade commercial office building was completed in 2012 with 25,080 sq.m of commercial space and 580 sq.m of retail space. It has an average floorplate of around 1,320 sq.m
- Sydney Water Headquarters: Located at 40-60 Darcy Street, Parramatta to the north of the train station. The 16 storey commercial building was completed in 2009 with a net lettable area of 23,000 sq.m and an average floorplate of 1,600 sq.m.

It is noted that most recent office buildings are around 20,000 sq.m in size with a floorplate of over 1,300 sq.m. This reflects the difficulties in achieving the necessary pre-commitments to develop large office buildings and the trend towards larger floorplates to meet the requirements of office tenants. These buildings are in line with the threshold for new A-Grade office space in major CBDs (20,000 sq.m building size and 1,000 sq.m floorplate) as outlined in the *A Guide to Office Building Quality 2012*.

Notable Office Buildings

PARRAMATTA CBD TABLE 2.1

Address (Name)	Year Completed	Floorplate (sq.m)	NLA* (sq.m)	Parking	Key Tenants
20 O'Connell Street, Parramatta (Jessie Street Centre)	1988	1762 - 1987	53,824	350	Australian Taxation Office, Arthur J Gallagher
1 Charles Street, Parramatta (NSW Police Headquarters)	2003	3,300	32,735	444	NSW Police
169 Macquarie St, Parramatta (1PSQ)	2016	1,400-2,200	26,498	92	Western Sydney University
60 Station Street East, Parramatta (Eclipse Tower)	2012	1,320	25,660	144	Deloitte, QBE, Landcom, Servcorp
105 Phillip St, Parramatta	2018	1,400-1,873	24,953	48	Black Seed Eatery, NSW Department of Education
40 - 60 Darcy Street, Parramatta (Sydney Water Headquarters)	2009	1,600	23,000	354	Sydney Water
150 George Street, Parramatta (Colonial Tower)	1992	1,100	21,964	492	Commonwealth Bank
Parramatta Justice Precinct	2007	2,100	21,000	N/a	Department of the Attorney General.
110 George Street, Parramatta (The Octagon)	1990	3,200	20,845	343	Department of Veterans Affairs Network, HealthShare NSW, Page Personnel
130 George Street, Parramatta	1984	1,440	19,894	332	AON, Department of Human Services, Hays Recruitment, Medicare, NSW Police
101 George Street, Parramatta (101 George)	2006	1,930	18,066	295	Commonwealth Bank, MMD Construction Consultants
10 Valentine Avenue, Parramatta (Macquarie Tower)	1987	1,256	15,996	316	Various NSW government agencies, My Credit Union
10 Smith Street, Parramatta (The Barrington)	1970	1,208	13,609	167	HSBC, Matthews Folbigg Lawyers, NSW Fair Trading, Robert Walters
18 Smith Street, Parramatta (Century Centre)	2000	1,600	11,984	172	Australian Electoral Commission, Suncorp and Telstra
25 Smith Street, Parramatta	2007	1,293	11,058	51	IAG
2 Wentworth Street, Parramatta (Signature Tower)	1989	1,100	10,941	118	Various NSW government agencies
27 Argyle Street, Parramatta (The Centurion)	2006	1,395	10,249	129	Various NSW government agencies
100 George Street, Parramatta	1982	732	10,000	105	University of Western Sydney, Coleman Greig, ACMA
1 Fitzwilliam Street, Parramatta (Enterprise House)	1988	1,500	9,782	106	Raffles College of Design and Commerce
75 George Street, Parramatta	1985	1,850	9,535	103	Chandler Macleod Group, Hymix Australia, Reachlocal Australia
31 Macquarie Street, Parramatta (Macquarie Towers)	1983	1,100	9,400	204	Department of Community Services, Office Of State Revenue
56 Station Street East, Parramatta	1988	1,100	9,010	206	QBE
132 Marsden Street, Parramatta (Lang Centre)	1985	2,004	8,744	230	Office of State Revenue

*Note: *Net Lettable Area*
Source : Cityscope ; Urbis

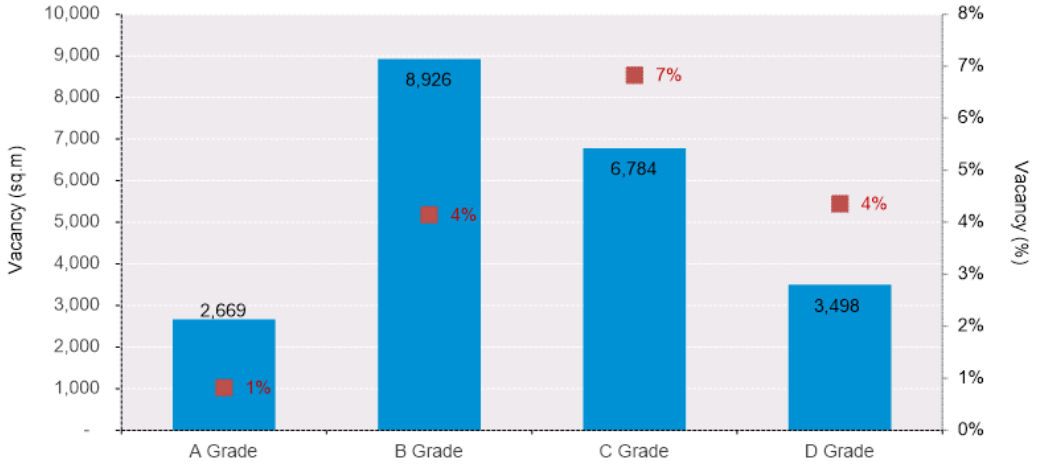
2.4. VACANCY LEVEL BY GRADE

Chart 2.3 outlines the office vacancy by grade in the Parramatta CBD as at January 2019. Overall, the Parramatta CBD recorded a vacancy rate of 3.0% in January 2019 with key characteristics including:

- A-Grade office has the lowest vacancy level with 2,669 sq.m of vacant space equating to a 1% vacancy rate. The A-Grade vacancy rate has remained under 2% since January 2016
- B and D-Grade have the same vacancy rate of 4% with vacant spaces of 8,926 sq.m and 3,498 sq.m respectively
- C-Grade office has the highest vacancy rate of 7% with 6,784 sq.m of vacant space.

Office Vacancy by Grade

Parramatta CBD, January 2019 Chart 2.3



Source : PCA Office Market Report January 2019 ; Urbis

2.5. HISTORIC NET ABSORPTION BY GRADE

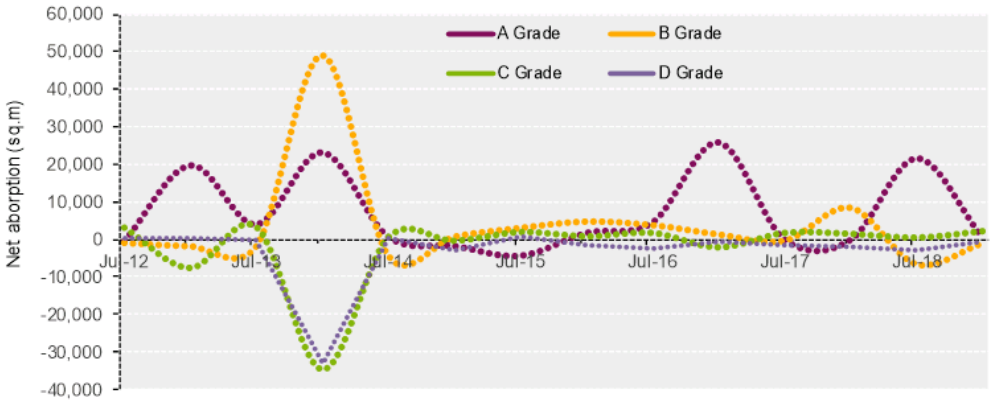
Chart 2.4 illustrates the six month net absorption rate in the Parramatta CBD office market from July 2012 to January 2019. The net absorption of A-Grade office space included:

- *July 2018:* Completion of 105 Phillip Street which is absorbed by NSW Department of Education
- *Late 2016:* Completion of 1PSQ which is absorbed by Western Sydney University
- *Late 2012:* Completion of the Eclipse Tower
- *Late 2013:* Reclassification of existing office buildings under the grading scheme. This included the increase in A-Grade and B-Grade space at the expense of lower grade stock. It is noted that there was no additional A-Grade or B-Grade space developed in this year.

Overall, the chart highlights the limited net absorption of stock other than the completion of major buildings in 2012, 2016 and 2018.

6 Months Net Absorption by Grade

Parramatta CBD, July 2012 to January 2019 Chart 2.4



Source : PCA Office Market Report January 2019 ; Urbis

2.6. RENTAL COST

Table 2.2 outlines the office rental rates in the Parramatta CBD for A-Grade and B-Grade office space in early 2019.

- Existing A-Grade office in Parramatta is reported to achieve gross face rents of $635-$705/sq.m, net face rent of $510-$580/sq.m and net effective rent of $420-$480/sq.m
- B-Grade office in Parramatta is reported to achieve gross face rent of $550-$610/sq.m, net face rent of $430-$490/sq.m and net effective rent of $355-$405/sq.m
- Gross face rent for A and B grade offices have grown by 7.5% p.a. and 8.9% p.a. since March 2015
- Net face rent for A and B grade offices have grown by 7.7% p.a. and 10.1% p.a. since March 2015.

Office Market Rents

PARRAMATTA CBD, MARCH 2019 TABLE 2.2

	Gross Face Rent ($/sq.m)	Net Face Rent ($/sq.m)	Net Effective Rent ($/sq.m)
2019			
A Grade Office	635-705	510-580	420-480
B Grade Office	550-610	430-490	355-405
2015			
A Grade Office	450-555	360-450	306-360
B Grade Office	365-460	275-350	227-263
Growth Rates			
A Grade Office	7.5%	7.7%	
B Grade Office	8.9%	10.1%	

Source : Savills; Urbis

Table 2.3 shows the asking rent with lease commencement date in 2019 for office vacancies in the Parramatta CBD. Most of the office vacancies are for smaller tenancies under 1,000 sq.m, which reflects the low vacancies in A-Grade stock. Comparatively, A-Grade office space in Parramatta CBD is affordable in a metropolitan context. It is currently about half the net effective rent of Sydney CBD; about two-thirds when compared to North Sydney CBD; similar to Chatswood; and about 60% more expensive than Macquarie Park/North Ryde which has more of a business park setting. A detailed comparison of Parramatta CBD to other business districts is set out in Section 3 of this report.

Asking Office Rents

PARRAMATTA CBD, 2019 TABLE 2.3

Address	Asking Rent ($/sq.m)	Floor Area (sq.m)
100 George Street, Parramatta	$550 Gross	230
9 Wentworth Street, Parramatta	$400 Gross	448
110 George Street, Parramatta	$510 Net	937
256 Church Street, Parramatta	$553 Net	190
7 Hassall Street, Parramatta	$350 Gross	944
10 Smith Street, Parramatta	$500 Net	1,197
4-12 Macquarie Street, Parramatta	$490 Net	8,100
9 George Street, Parramatta	$440 Net	850
16-18 Wentworth Street, Parramatta	$380 Net	3,497
88 Phillip Street, Parramatta	$480 Net	590
1-3 Fitzwilliam Street, Parramatta	$460 Net	398
3 Horwood Place, Parramatta	$495 Net	138
35 Smith Street, Parramatta	$400 Net	220
91 Phillip Street, Parramatta	$475 Net	972
87 Marsden Street, Parramatta	$495 Net	1,057

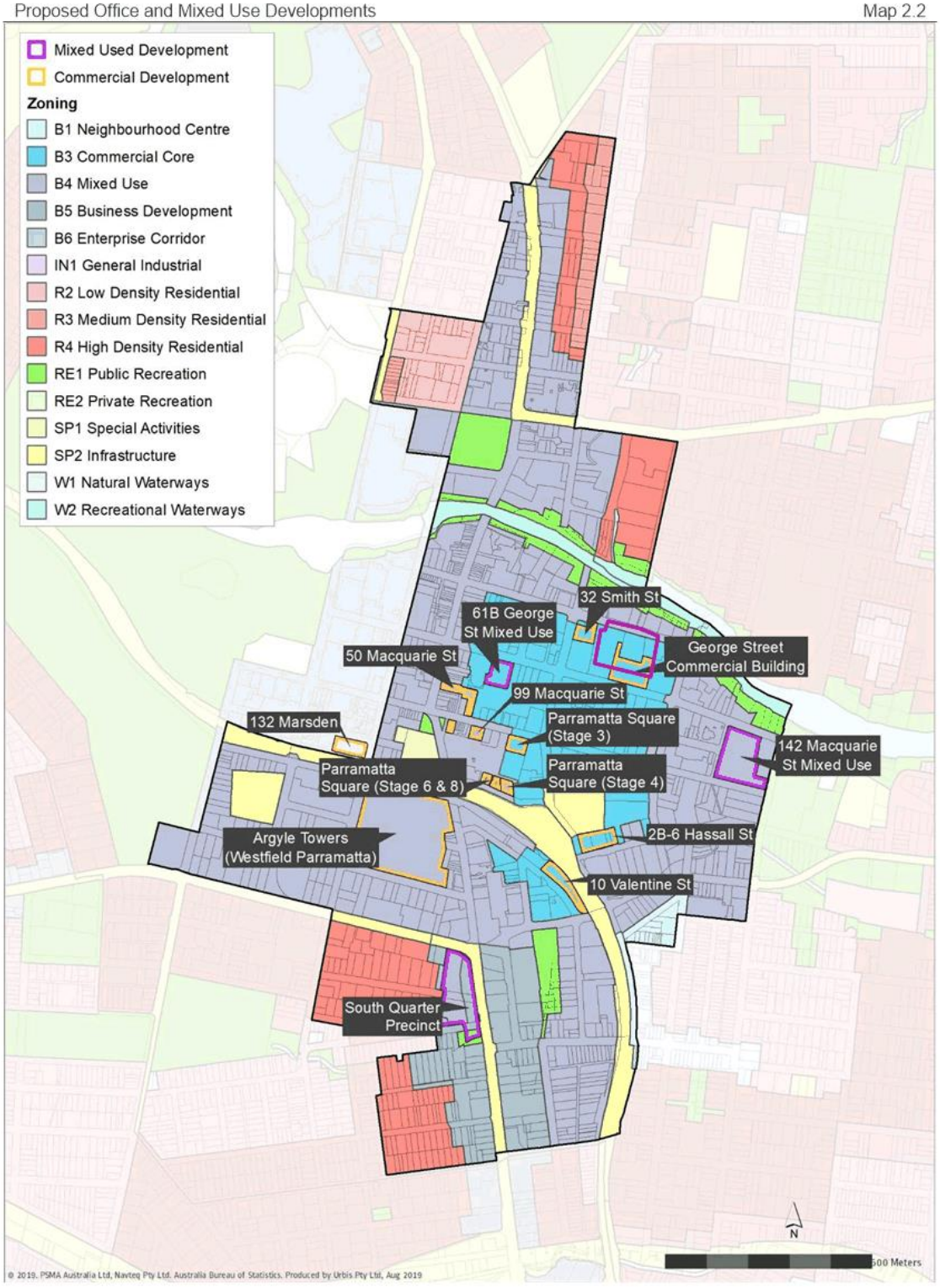
Source: Urbis

2.7. PROPOSED NEW DEVELOPMENT

Table 2.4 outlines the major proposed office developments in and around the Parramatta CBD. The majority of proposed office space is contained within the Parramatta Square development. Overall, there is almost 608,000 sq.m of proposed office space. This compares to 280,000 sq.m of office space in the pipeline as at May 2015.

- **George Street Commercial Development** is a 33 storey, commercial development with an estimated 45,700 sq.m of A grade commercial space
- **Argyle Towers** is a 42 storey commercial tower on top of Westfield Parramatta with an estimated 112,000 sq.m of A-Grade commercial space
- **32 Smith** is a 28 storey office building with retail space on ground floor and car parking on podium level, it is estimated to have 26,000 sq.m of commercial space
- **6 Hassall** is a mixed use development to be tenanted by WSU and UNSW, it will have an estimated 28,000 sq.m of commercial office space.
- **Parramatta Square** is to be developed over several stages and the following key stages remain to be completed include:
  - *Stage 3 (currently under construction):* Office tower with around 43,000 sq.m of A-Grade commercial floorspace and NAB committed as a sole tenant
  - *Stage 4 (currently under construction):* A commercial tower above a 4 storey podium incorporating retail with 65,000 sq.m of A-Grade floorspace
  - *Stage 6:* Commercial office tower with approximately 45,000 sq.m of A-Grade commercial floorspace
  - *Stage 8:* A 55 storey tower with an estimated 80,000 sq.m of A-Grade commercial floorspace. Parramatta Square Stage 8 is intended to be constructed concurrently with Stage 6.

Proposed Office and Mixed Use Developments Map 2.2



Proposed New Office Developments

PARRAMATTA CBD, AS AT APRIL 2019 TABLE 2.4

Project Title	Project Address	Development Type	Status	Estimated Commercial Floorspace (sq.m)*	Anticipated Office Grade
32 Smith St	32 Smith St	Commercial	Construction	26,400	A
Parramatta Square (Stage 3)	153 Macquarie St	Commercial	Construction	46,000	A
Parramatta Square (Stage 4)	30 Darcy St	Commercial	Construction	64,000	A
Parramatta Square (Stage 6)	12-38 Darcy St	Commercial	Development Approval	45,000	A
George Street Commercial Building	140 George St	Commercial	Development Approval	45,700	A
Argyle Towers (Westfield Parramatta)	Argyle St & Church St	Commercial	Mooted	112,000	A
Parramatta Square (Stage 8)	188 Church St	Commercial	Mooted	80,000	A
10 Valentine St Mixed Use	10 Valentine Ave	Commercial	Mooted	9,000	A
50 Macquarie St	50 Macquarie St	Commercial	Mooted	25,222	A
99 Macquarie St	99 Macquarie St	Commercial	Mooted	9,000	A
South Quarter Precinct	57-83 Church St	Mixed Use	Mooted	8,000	A
142 Macquarie St Mixed Use	142-154 Macquarie St	Mixed Use	Mooted	15,000	A
61B George St Mixed Use	61B George St	Mixed Use	Mooted	65,000	A
6 Hassall St Mixed Use	6 Hassall St	Commercial	Mooted	28,000	A
132 Marsden	132 Marsden St	Commercial	Mooted	30,000	A
Total				**608,322**	

*Note: * Estimated net lettable area*

Source: PCA Office Report; Cordell Connect; Urbis; Parramatta City Council

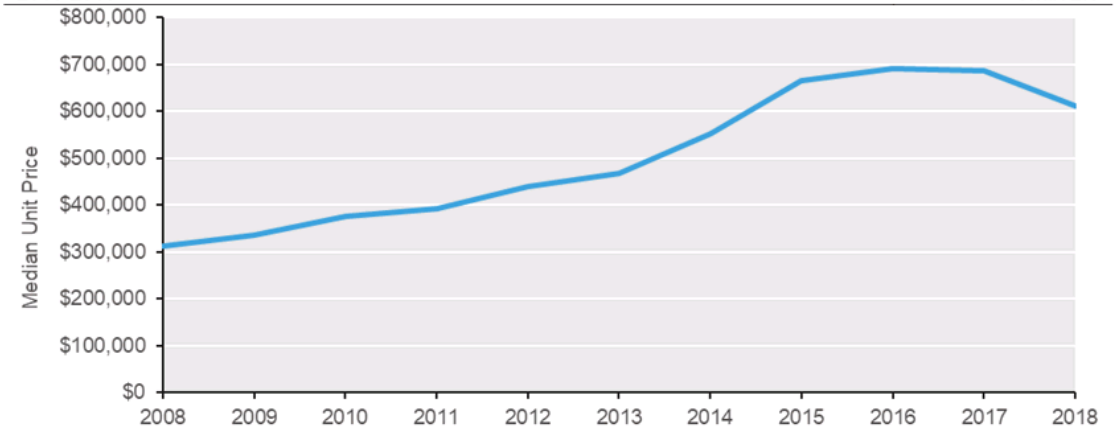
2.8. RESIDENTIAL MARKET

The residential market has softened over the last two years since the Sydney residential market peaked in mid-2017. Chart 2.5 outlines the significant price growth in units in Parramatta (suburbs of Parramatta, Westmead and Harris Park) from $300,000 in 2008 to $690,000 in 2017. The median unit price declined by over 10% in 2018, which was characterised by significantly lower activity in the residential market, especially for off-the-plan apartments. Off-the-plan apartment projects that had previously recorded very strong take-up rates slowed down with sales reducing to below two a month for some projects. This slowdown meant that projects were struggling to achieve the required presales to move to construction and has resulted in projects being deferred.

The slowdown in the residential market has meant developers are looking at alternative land uses that are more viable from a feasibility perspective. When the residential market was booming from 2013-2015, developers were attempting to maximise their residential yield on sites as returns were higher than alternative land uses. As outlined earlier, office rents in Parramatta have increased in the last three years, which has improved the viability of office development and has resulted in more office development occurring.

Parramatta Median Unit Price

2018-2018 Chart 2.5



Source: APM PriceFinder

3. COMPETITIVE COMMERCIAL LOCATIONS

This section provides profiles of commercial centres that are considered to be the key competitors to the Parramatta CBD. The profiles provide a summary of key characteristics including transport infrastructure, amenity, current and historical office performance and development and residential development.

- Sydney CBD
- North Sydney CBD
- North Ryde/ Macquarie Park
- Chatswood CBD
- Brisbane CBD.

While the Brisbane CBD is not considered to be a key competitor to the Parramatta CBD, a profile has been included as there are some key similarities and implications relating to the potential development of the Parramatta CBD.

3.1. SYDNEY CBD

SYDNEY CBD					
DESCRIPTION	The Sydney CBD is the main financial and economic hub of Australia. It extends southwards for approximately 3km from Circular Quay to Central Train Station and is bounded by Darling Harbour to the west, and Hyde Park/The Domain to the east.				
AREA	2.4 sq.km				
AMENITIES	The Sydney CBD boasts extensive retail offerings including Westfield Sydney, the Queen Victoria Building and others. These range from convenience retailers to luxury boutique operations. There is significant public domain along the Sydney Harbour foreshore, Royal Botanic Gardens and Hyde Park.				
TRANSPORT INFRASTRUCTURE	**Train:** Six train stations (Central, Town Hall, Wynyard, Museum, Circular Quay and St James) connect the Sydney CBD to the rest of Sydney. Intercity train services also connect Sydney CBD to other towns and cities outside Sydney metro area (e.g. Central Coast, Illawarra and South Coast, Blue Mountains). Sydney Metro will extend from Sydney's North West into the Sydney CBD in 2024. **Bus:** Express (Metrobus) and normal buses to most areas of Sydney, in particular eastern, southern, north shore and beaches, and inner-western suburbs. **Light Rail:** Connects Sydney CBD to inner western Sydney. A new light rail line which extends from Circular Quay to Kingsford/Randwick is currently under construction. **Ferry:** Circular Quay is the hub of the ferry network and it connects the Sydney CBD to Manly, Balmain, eastern suburbs, lower north shore and Parramatta River. **Car:** Connected to Greater Sydney by major arterial roads such as Eastern Distributor, Western Distributor, Parramatta Road and Sydney Harbour Bridge.				
WHITE COLLAR RESIDENT WORKERS (5KM RADIUS)	208,068				
STOCK (JANUARY 2019)	**STOCK (SQ.M)**	**% OF TOTAL STOCK**	**VACANCY (SQ.M))**	**VACANCY (%)**	**NET ABSORPTION (SQ.M)[1]**
Premium Grade	1,162,107	23%	43,899	4%	22,264
A-Grade	1,825,649	36%	65,488	4%	8,488

B-Grade	1,380,675	28%	61,962	5%	-7,395
C-Grade	453,893	9%	21,654	5%	-8,361
D-Grade	186,909	4%	10,914	6%	-1,717
Total Stock	**5,009,233**	**100%**	**203,917.**	**4%**	**13,278**
A-GRADE RENTS (JANUARY 2019)	Gross Face Rent ($/sq.m)		$1,045 - $1,370		
	Net Face Rent ($/sq.m)		$880 - $1,175		
	Net Effective Rent ($/sq.m)		$699 - $933		
MEDIAN NLA AND FLOORPLATE OF A-GRADE STOCK [2]	Net Leasable Area (sq.m)		15,680		
	Floorplate (sq.m)		1,181		
RESIDENTIAL	The number of residential dwellings increased from around 12,680 in 2011 to 13,700 in 2016. There has been a growing trend towards older office buildings being redeveloped into residential apartments.				
COMPETITIVE POSITION	The Sydney CBD is arguably Australia's commercial gateway to the world and is Australia's financial hub. As a result the majority of national headquarters are located in the Sydney CBD.				

Note: 1. Average annual absorption over last 10 years. 2. Median net lettable area and floorplate of A-Grade stock completed in the last 10 years.
Source: PCA, ABS, Urbis

3.2. NORTH SYDNEY

NORTH SYDNEY					
DESCRIPTION	North Sydney is a major commercial district in the lower north shore of Sydney. It extends northwards for approximately 1.6km from Luna Park along the Pacific Highway.				
AREA	0.7 sq.km				
AMENITIES	The retail offering is concentrated north of the North Sydney railway station around Greenwood Plaza and Berry Square. There are relatively few public domain areas in the core of the CBD				
TRANSPORT INFRASTRUCUTRE	**Train:** Access to two stations (North Sydney and Milsons Point) on the North Shore, Northern and Western line. A metro station at Victoria Cross will provide metro rail access to the North Sydney CBD between Rouse Hill and Bankstown from 2024. **Bus:** Connects North Sydney CBD to local surrounding areas, train stations and the Sydney CBD. A Metrobus route passes through North Sydney, connecting Artarmon to Botany via Sydney CBD. **Light Rail:** None **Ferry:** Milsons Point Wharf which has services along the Parramatta River and Sydney Harbour. **Car:** Connected by Pacific Highway and Warringah Freeway.				
WHITE COLLAR RESIDENT WORKERS (5KM RADIUS)	176,189				
STOCK (JANUARY 2019)	**STOCK (SQ.M)**	**% OF TOTAL STOCK**	**VACANCY (SQ.M))**	**VACANCY (%)**	**NET ABSORPTION (SQ.M)** [1]
Premium Grade	36,500	5%	2,194	6%	775
A-Grade	225,715	28%	7,008	3%	-2,953
B-Grade	396,952	49%	35,016	9%	267
C-Grade	137,331	17%	9,910	7%	1,934

D-Grade	12,932	2%	509	4%	255
Total Stock	**809,430**	**100%**	**54,637**	**7%**	**1,137**
A-GRADE RENTS (JANUARY 2019)	Gross Face Rent ($/sq.m)		$940 - $1,085		
	Net Face Rent ($/sq.m)		$800 - $930		
	Net Effective Rent ($/sq.m)		$627 - $729		
MEDIAN NLA AND FLOORPLATE OF A-GRADE STOCK [2]	Net Leasable Area (sq.m)		42,000		
	Floorplate (sq.m)		1,543		
RESIDENTIAL	There has been a growing trend towards older office buildings (in Milsons Point especially) being redeveloped into residential apartments.				
COMPETITIVE POSITION	The North Sydney CBD benefits from its Harbour Front location in close proximity to the Sydney CBD. North Sydney has experienced significant competition in the last decade from North Ryde with telecommunications companies relocating out of North Sydney. The CBD is relatively constrained with only a couple of key development sites remaining in the CBD.				

Note: 1. Average annual absorption over last 10 years. 2. Median net lettable area and floorplate of A-Grade stock completed in the last 10 years.
Source: PCA, ABS, Urbis

3.3. NORTH RYDE/ MACQUARIE PARK

NORTH RYDE/ MACQUARIE PARK					
DESCRIPTION	The North Ryde/Macquarie Park centre consists of the Macquarie Park corridor, a major research and business centre for communications, medical research, pharmaceutical and IC&T sectors. It extends south eastward for 4km from Macquarie University.				
AREA	2.2 sq.km				
AMENITIES	Few retail opportunities for workers that are not located in the immediate surroundings of Macquarie Centre. There is limited public domain in the precinct.				
TRANSPORT INFRASTRUCUTRE	**Train:** Access to three train stations (Macquarie Park, Macquarie University and North Ryde) on the Sydney Metro Northwest line that opened in May 2019. The metro provides frequent connections between Rouse Hill and Chatswood via Epping. This line will be extended to the Sydney CBD from 2024. **Bus:** Around 30 bus routes travel in and around the precinct from the Sydney CBD, North Sydney, Parramatta, Hurstville, Chatswood and Castle Hill. **Light Rail:** None, however there has been discussions around the potential for a future Macquarie Park-Parramatta light rail line. **Ferry:** None **Car:** Accessible via the M2 Motorway, Epping Road and Lane Cove Road.				
WHITE COLLAR RESIDENT WORKERS (5KM RADIUS)	82,944				
STOCK (JANUARY 2019)	**STOCK (SQ.M)**	**% OF TOTAL STOCK**	**VACANCY (SQ.M)**	**VACANCY (%)**	**NET ABSORPTION (SQ.M)** [1]
Premium Grade	0	0%	N/a	N/a	0
A-Grade	644,824	75%	22,366	4%	10,812
B-Grade	196,104	23%	16,942	9%	-1,301
C-Grade	15,385	2%	1,780	12%	-340
D-Grade	2,721	0%	0	0%	0

Total Stock	**859,034**	**100%**	**41,088**	**5%**	**9,171**
A-GRADE RENTS (JANUARY 2019)	Gross Face Rent ($/sq.m)		$420 - $505		
	Net Face Rent ($/sq.m)		$315 - $400		
	Net Effective Rent ($/sq.m)		$230 - $290		
MEDIAN NLA AND FLOORPLATE OF A-GRADE STOCK [2]	Net Leasable Area (sq.m)		29,597		
	Floorplate (sq.m)		2,750		
RESIDENTIAL	There are virtually no residential apartments located within the North Ryde/ Macquarie Park precinct. Residential apartments have been developed nearby the train stations of North Ryde and Macquarie University.				
COMPETITIVE POSITION	North Ryde/ Macquarie Park has recorded significant growth and has surpassed North Sydney and Parramatta to be Sydney's second largest office market. It has benefited from the ability to develop low-rise (i.e. less than 10 storeys) large floorplate office buildings on large sites at relatively low prices. This has allowed it to attract office tenants to purpose built campus-style facilities with relatively cheap rents compared to "conventional" office tower supplies in centres like Sydney CBD, North Sydney, Chatswood and Parramatta.				

Note: 1. Average annual absorption over last 10 years. 2. Median net lettable area and floorplate of A-Grade stock completed in the last 10 years.
Source: PCA, ABS, Savills, Urbis

3.4. CHATSWOOD

CHATSWOOD					
DESCRIPTION	Chatswood is a core commercial and retail district in the North Shore. The precinct extends approximately 1km from Pacific Highway along Victoria Ave.				
AREA	0.5 sq.km				
AMENITIES	Due to the small size of the precinct, retail amenities are accessible and they are concentrated in Westfield Chatswood and Chatswood Chase. The retail footprint has extended to also include areas around the Chatswood Transport Interchange, which is focused on food and beverage offers that are also accessible to the local office based workforce. Public domain in the form of open space and seats from Chatswood station along the Victoria Ave retail strip.				
TRANSPORT INFRASTRUCUTRE	**Train:** Access to Chatswood station to the North Shore and Northern Line and Western Line. The Sydney Metro Northwest project upgraded the railway between Epping and Chatswood and extended to Rouse Hill, opening in May 2019. This line will be extended into the Sydney CBD from 2024. **Bus:** Variety of local bus routes connects Chatswood to its surrounding areas. Cross-regional and Metrobus services link Chatswood to Parramatta and Bondi Junction. **Light Rail:** None **Ferry:** None **Car:** Accessible via the Pacific Highway and Gore Hill Freeway.				
WHITE COLLAR RESIDENT WORKERS (5KM RADIUS)	97,934				
STOCK (JANUARY 2019)	**STOCK (SQ.M)**	**% OF TOTAL STOCK**	**VACANCY (SQ.M)**	**VACANCY (%)**	**NET ABSORPTION (SQ.M)** [1]
Premium Grade	0	0%	N/a	N/a	0
A-Grade	157,412	56%	6,162	4%	468
B-Grade	76,046	27%	5,609	7%	-217

C-Grade	45,007	16%	5,275	12%	161
D-Grade	454	0%	233	51%	-11
Total Stock	**278,919**	**100%**	**17,279**	**6%**	**401**
A-Grade Rents (January 2019)	GROSS FACE RENT ($/SQ.M)		$667		
	Net Face Rent ($/sq.m)		$539		
	Net Effective Rent ($/sq.m)		n/a		
MEDIAN NLA AND FLOORPLATE OF A-GRADE STOCK [2]	Net Leasable Area (sq.m)		3,000		
	Floorplate (sq.m)		N/a		
RESIDENTIAL	The number of residential dwellings increased from around 9,107 in 2011 to 10,499 in 2016. Since 2011, there has been additional residential development in and around the CBD including around 550 apartments in the Metro Residences above the Chatswood Transport Interchange. It is noted that residential had been blamed for a higher level of vacancy during 2008-2010, however this vacancy has fallen dramatically, indicating the impact of residential development may not have been that great.				
COMPETITIVE POSITION	The Chatswood CBD has not attracted much office development in the last decade. The CBD benefits from high amenity with Westfield Chatswood and a vibrant food and beverage and cultural offering. New residential apartment development has been the predominant form of development and has displaced a number of potential commercial sites.				

Note: 1. Average annual absorption over last 10 years. 2. Median net lettable area and floorplate of A-Grade stock completed in the last 10 years.
Source: PCA, ABS, Knight Frank, Urbis

3.5. BRISBANE CBD

BRISBANE CBD					
DESCRIPTION	Brisbane CBD is the financial and economic hub of Queensland. It is a triangular shaped area bounded by Brisbane River and Spring Hill with Gardens Point at its tip.				
AREA	1.2 sq.km				
AMENITIES	Extensive retail offerings throughout the precinct in particularly in and around Queen Street Mall. Strong public domain along the Brisbane River and Brisbane City Botanic Gardens.				
TRANSPORT INFRASTRUCUTRE	**Train:** Central and Roma Street train stations connects the Brisbane CBD to rest of Brisbane. The Cross River Rail is an underground railway through central Brisbane, which is currently under construction. **Bus:** Queen Street and King George Square bus stations **Light Rail:** None. Light rail has previously been proposed **Ferry:** Four wharfs (North Quay, QUT, Eagle Street Pier and Riverside) connect Brisbane CBD to areas around the Brisbane River **Car:** Accessible by Kelvin Grove Road to the north, Kingsford Smith Drive to the east, Coronation Drive to the west, and Pacific Motorway to the south				
WHITE COLLAR RESIDENT WORKERS (5KM RADIUS)	124,621				
STOCK (JANUARY 2019)	**STOCK (SQ.M)**	**% OF TOTAL STOCK**	**VACANCY (SQ.M)**	**VACANCY (%)**	**NET ABSORPTION (SQ.M)** [1]
Premium Grade	335,470	15%	34,778	10%	7,683
A-Grade	936,633	42%	92,644	10%	10,482
B-Grade	707,213	32%	123,105	17%	-11,081
C-Grade	193,646	9%	27,231	14%	206

D-Grade	54,055	2%	11,241	21%	112
Total Stock	**2,227,017**	**100%**	**288,999**	**13%**	**7,403**
A-Grade Rents (January 2019)	GROSS FACE RENT ($/SQ.M)			$650 - $750	
	Net Face Rent ($/sq.m)			$530 - $595	
	Net Effective Rent ($/sq.m)			$303 - $333	
MEDIAN NLA AND FLOORPLATE OF A-GRADE STOCK [2]	Net Leasable Area (sq.m)			44,850	
	Floorplate (sq.m)			1,480	
RESIDENTIAL	There was an estimated 5,500 residential dwellings in the Brisbane CBD in 2016. The CBD has created a vibrant precinct with a mix of quality residential apartment buildings looking over the Brisbane River. Residential has been a significant part of the Brisbane CBD. In the early 2000's there was a fear that residential would take over all of the available commercial sites. Whilst residential did increase quickly, once the demand for office surged, the highest and best use flipped and now there is an oversupply of office.				
COMPETITIVE POSITION	The Brisbane CBD is home to the majority of major corporate businesses in Brisbane. Office is more heavily influenced by State Government, with a strong representation from mining related companies. Brisbane does not have the same fragmented office market as Sydney does. The CBD is surrounded by several fringe office markets with lower density office buildings though there are no major suburban centres.				

Note: 1. Average annual absorption over last 10 years. 2. Median net lettable area and floorplate of A-Grade stock completed in the last 10 years.
Source: PCA, ABS, Urbis

3.6. IMPLICATIONS FOR PARRAMATTA

The commercial CBD profiles outlined above have implications for the Parramatta CBD including:

- **Area:** The Parramatta CBD (as defined by the PCA OMR) covers an area of around 1.4 sq.km with total office stock of around 720,000 sq.m. In comparison, the Brisbane CBD covers an area of around 1.2 sq.km and almost 2.2 million sq.m of office space. This indicates that the Parramatta CBD has the potential to increase in density.

  The main commercial core to the north of the train line, accounts for an area of around 0.3 sq.km, which equates to approximately 20% of the total area

- **Amenity:** The Parramatta CBD boasts high amenity with Westfield Parramatta, the Parramatta River and surrounding parkland, Church Street 'eat street', Western Sydney Stadium, Riverside Theatres and access to a range of personal services desirable to office workers

- **Residential:** The Parramatta CBD (as defined by the PCA OMR) recorded an estimated 5,539 dwellings in 2016, with growth of 1,629 dwellings from 2011. This equated to average annual growth of 7.2% over the five years. Most CBDs contain residential development to create a more vibrant centre

- **A-Grade Office:** Parramatta has very low A-Grade office vacancy rates around 1%. This is normally a strong indicator that there is demand in the market for additional development as large tenants looking to expand operations do not have any existing space to move into and therefore need new buildings. A-Grade office vacancy rates in the profiled centres generally range from 4-7% in January 2019, which is usually indicative of markets operating around equilibrium. Despite Brisbane CBD having the highest vacancy rate of 13%, Brisbane is still experiencing strong demand as 25,000 sq.m was absorbed from July 2018 to January 2019

- **Rents:** Despite very low vacancy rates, A-Grade rents were not at levels that would support large scale A-Grade office development. This has changed in recent years as rents have increased and facilitated new development

- **Recent Development:** Most recent office buildings have required pre-commitments to facilitate development. This is likely in order to attract a rental level high enough to meet the required return on investment.

4. DRIVERS OF OFFICE TENANT DEMAND

This section reviews market drivers for commercial office floorspace demand, examining the future economic drivers and trends that will influence the mix of businesses operating within the Parramatta CBD. This includes major attractors influencing the decision for tenants / businesses. Urbis spoke to office leasing agents to help inform the assessment of what major prospective office tenants are looking for and how they view the Parramatta CBD.

Office tenants look at a range of factors when choosing an office building/location. Key factors include:

- Business operational benefits
- Attractiveness to existing and potential staff to support retention and recruitment
- Rental costs
- Accessibility
- Building costs
- Floorplate size and flexibility
- Access to high value management staff.

Drivers of Office Tenant Supply

PARRAMATTA CBD TABLE 4.1

Driver	Description	Assessment of Parramatta CBD
Public Transport	▪ Within easy walking distance of major public transport interchanges that provide access to workers over a large catchment area. Key modes of transport include: – Train – Bus – Ferry – Light Rail.	▪ The Parramatta railway station (refurbished in the mid-2000's) is a major interchange, on the Blue Mountains, Cumberland and Western lines. A number of government and privately provided bus routes also service Parramatta, including the North West T-Way (to Rouse Hill) and the Liverpool-Parramatta T-Way (to Liverpool), and five "Metrobus" services. A free bus route (Route 900) is operated by the NSW Government providing free transport around the Parramatta CBD ▪ The NSW government announced the Sydney Metro West project in November 2016, which will connect Parramatta and the Sydney central business districts ▪ Ferry access is available via the Parramatta Ferry Wharf along the Parramatta River to Circular Quay. However, ferry services are not well scheduled for commuters with hourly shuttle services before 9am connecting Parramatta and Rydalmere wharfs. Services continue between Rydalmere and Circular Quay ▪ The Parramatta Light Rail stage 1 which will connect Westmead to Carlingford via the Parramatta CBD and Camellia is expected to open in 2023. An estimated 130,000 people will be living within walking distance of light rail stops and around 28,000 people will use the Parramatta Light Rail every day by 2026 ▪ The Parramatta CBD is seen by corporations as being very accessible to a large prospective workforce with multiple public transport options including train, bus and ferry.
Access to Parking	▪ Access to parking within the building/site or nearby for staff and clients.	▪ Vehicular access to Parramatta CBD is via Parramatta Road, the Great Western Highway, the M4 Western Motorway, Woodville Road, Windsor Road and James Ruse Drive ▪ There is a view that the Parramatta CBD is becoming very congested during the morning and evening peak with a shortage of parking. Limited westbound connections from Parramatta CBD to the M4 Motorway exacerbate congestion issues as vehicles must either use the Cumberland Highway (via Great Western Highway) or James Ruse Drive interchanges to commence westbound journeys.
Access to Workers	▪ Location in proximity to where the majority of existing and potential staff live to improve staff retention and recruitment ▪ Major office tenants generally place a higher priority on access to high value management staff, which are more difficult to replace.	▪ Parramatta is centrally located within Greater Sydney, which provides access to a large potential labour force. This is supported by a relatively strong public transport network (as discussed above) ▪ Major office tenants located in business parks have identified issues with retaining and attracting staff due to relatively poor accessibility, which has led them to look at locations such as the Parramatta CBD ▪ The Parramatta CBD has access to more affluent areas, where senior management are more likely to live, such as the Parramatta Ferry and North Shore train line (though direct connection to the North Shore train line relies on over a 40 minute journey via Central Sydney).

Driver	Description	Assessment of Parramatta CBD
Access to Clients/ Customers	▪ Proximity to key clients and customers to improve relationships and achieve synergies.	▪ Parramatta has successfully attracted professional service firms such as accounting and legal operations looking to service their growing customer base in Western Sydney. Other major corporations are also looking at Parramatta as part of their national portfolio of offices and expanding into the growing Western Sydney region. Stages of Parramatta Square has been pre-committed to the NSW Government and NAB ▪ The Global significance of the Sydney CBD means that the Parramatta CBD is unlikely to attract major corporate headquarters away from the Sydney CBD, however organisations such as NAB will see utility in Parramatta as a strong location for secondary support functions.
Proximity to Suppliers	▪ Proximity to key suppliers to improve relationships and achieve operational benefits.	▪ The Parramatta CBD has generated a relatively strong critical mass across sectors such as legal, professional services and government services, which has benefits for businesses. This provides access to support services that are important to major corporations.
Corporate Image	▪ The office location(s) have implications for the corporate image of a business such as: – Global nature – Success. ▪ Importance of clients.	▪ The Sydney CBD has the strong image as Australia's Global Commercial Centre, which will make it difficult for Parramatta to attract international headquarters. However, once a corporation has set up regional headquarters in Central Sydney and become established, the Parramatta CBD may become the preferred choice for additional/ secondary offices, or for back office operations ▪ Since the early 2000's, Parramatta has seen a number of government agencies relocate their head offices to the area, creating a "government centre". This includes the New South Wales Police Force and Sydney Water Corporation with the government looking to highlight the importance of Parramatta and Greater Western Sydney. Furthermore, stage 4 of Parramatta Square has been pre-committed to the NSW government and stage 3 to NAB. The University of New South Wales and Western Sydney University has secured the majority of 2-6 Hassall Street while QBE have preleased 51% of 32 Smith Street.
Views	▪ Attractive views can be viewed as a sign of corporate success with water/harbour views considered to be a sign of prestige ▪ Major corporate businesses do not want to look out over poor quality buildings and residential apartments with 'washing on the balcony'.	▪ Parramatta boasts the proximity to the Parramatta River and significant parkland that provides a good outlook for office tenants ▪ In recent years, there has been several residential apartment buildings developed adjacent to the commercial core that are not considered to be of the highest quality.
Office Floorplates	▪ There has been a trend in recent years of professional firms looking to improve integration of business units and staff. This is best achieved by larger office floorplates with several consecutive floors that are connected by stairs. This includes floorplates of at least 1,300 sq.m though generally over 1,500 sq.m for major tenants.	▪ Parramatta has experienced significant competition from new centres such as North Ryde, Norwest and Sydney Olympic Park, which have been able to develop new large floorplate campus style office buildings ▪ The older office buildings generally have floorplates of under 1,100 sq.m, which have higher vacancy

Driver	Description	Assessment of Parramatta CBD
		▪ All recent office buildings developed in the last decade in the Parramatta CBD have been over 1,290 sq.m.
Building Quality	▪ Large corporate tenants want office space that is similar to what they occupy in capital city CBDs. This includes modern office buildings with attractive entrance/lobby, good lift service, good ceiling heights, on-site facilities and interconnecting staircases between levels (where possible).	▪ Most of the existing A-Grade stock in Parramatta is more than 10 years old and does not meet the requirements of larger corporate tenants. As such, businesses looking to expand and upgrade their stock do not have many options (if any at all) ▪ New office space developed in the Parramatta CBD (such as the 1PSQ, Eclipse Tower and Sydney Water Building) have been able to achieve these requirements for the tenants, which was a major contributor in securing them as major pre-commitments.
Cost of Office Space	▪ The cost of office space is an important consideration for businesses as they try to reduce operating costs. Rent represents a significant proportion of operational costs.	▪ Parramatta has experienced significant price competition with new large floorplate campus style office buildings able to charge lower rents due to the significantly lower construction costs compared to conventional office towers ▪ Discussion with agents indicates there is strong demand at current gross face rents of around $635-$705. Major tenants are willing to pay higher rents than business parks because of factors such as better amenity, accessibility, image and improved ability to attract and retain staff.
Proximity to Cafes/ Dining/ Bars	▪ An extensive rage of cafes, restaurants and bars is important to staff looking for opportunities to access food and beverage offerings ▪ Provision of hospitality businesses is also attractive to businesses looking to entertain clients.	▪ The dining and hospitality offer in the Parramatta CBD has improved considerably in recent years with the emergence of the Church Street precinct adding to the extensive offer in the CBD ▪ The Parramatta CBD is seen as providing significantly more local amenity than business parks which is supported by major corporations looking to relocate from business parks to CBD locations.
Proximity to Retail Amenity	▪ Office workers have a significant retail expenditure around their place of work and access to a large range of retail operations is attractive to workers.	▪ Westfield Parramatta, the second largest shopping centre in Sydney, is well integrated with the Parramatta CBD and Parramatta Transport Interchange. It provides workers with an extensive retail offering that is supported by strip retail along Church Street, Macquarie Street and George Street ▪ With office workers becoming more 'time poor', having access to good retail services in the Parramatta CBD is seen as an advantage by prospective tenants as workers in business parks have difficulty in undertaking personal tasks during lunch breaks and after work.
Access to Childcare	▪ Access to affordable childcare is an important consideration to businesses to retain staff.	▪ The Parramatta CBD is considered to have capacity for additional child care places though this is a characteristic that is common to most areas within Sydney.
Proximity to Gyms/ Recreation	▪ A lot of businesses have corporate packages with gyms as a benefit to staff members.	▪ The Parramatta CBD is home to several gyms that provide office workers with fitness options. Access to Parramatta Park and river foreshore provide passive recreation opportunities.

Source: Urbis

The following chart outlines the main triggers that led to tenants relocating to the North Sydney CBD. The data was part of a project undertaken for North Sydney Council in 2013 to assess the current supply and occupancy of office accommodation and attractiveness of North Sydney and make recommendations to support the economic vitality of the North Sydney Centre. A key part of the study was an online survey of office tenants regarding their view on North Sydney as an office market to inform what could be done to improve the attractiveness of the centre.

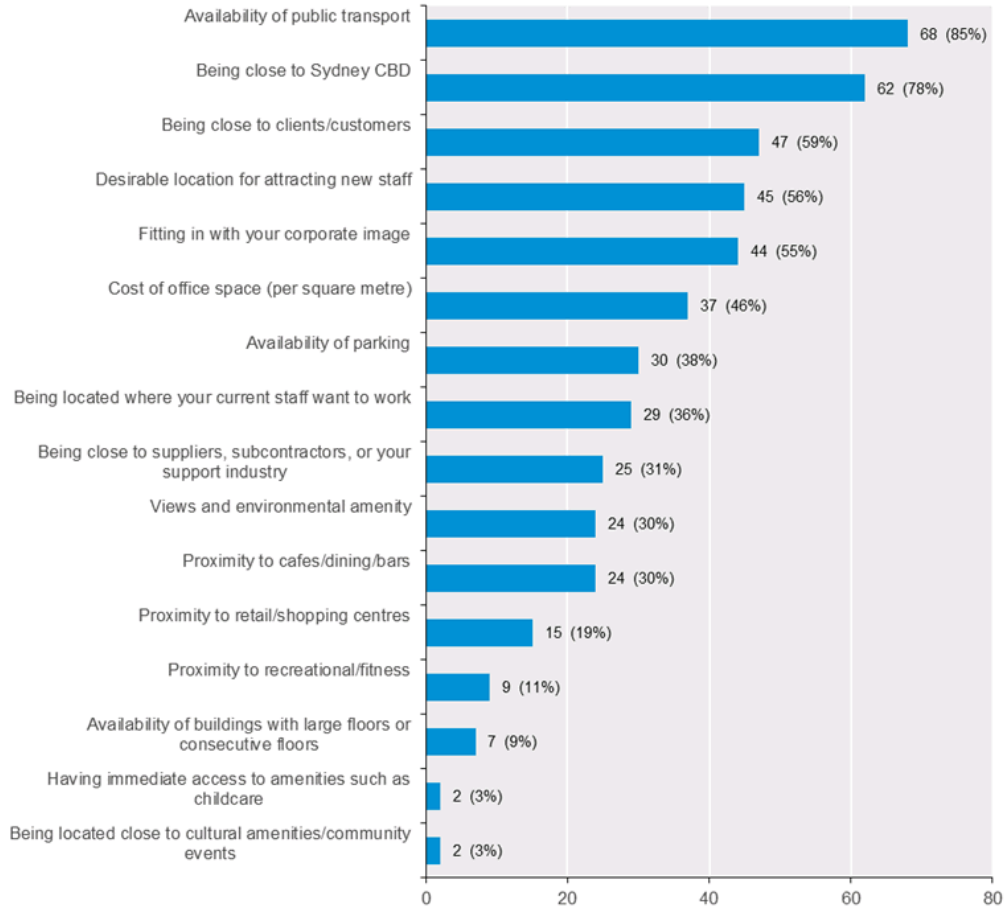
While not directly applicable to the Parramatta CBD, it does present an indication of key factors that are important to tenants. The major factors included:

- Availability to public transport, which reflects the importance of accessibility to staff
- Proximity to clients/customers (linked to proximity to Sydney CBD)
- Desirable location for attracting (and retaining) staff
- Fitting in with corporate image
- Cost of office space.

It is noted that the tenant survey included a high proportion of smaller tenants, which is why availability of buildings with large floors and consecutive floors recorded a relatively low response.

Main Triggers for Company's Move to North Sydney

Tenants Chart 4.1



Source: Urbis

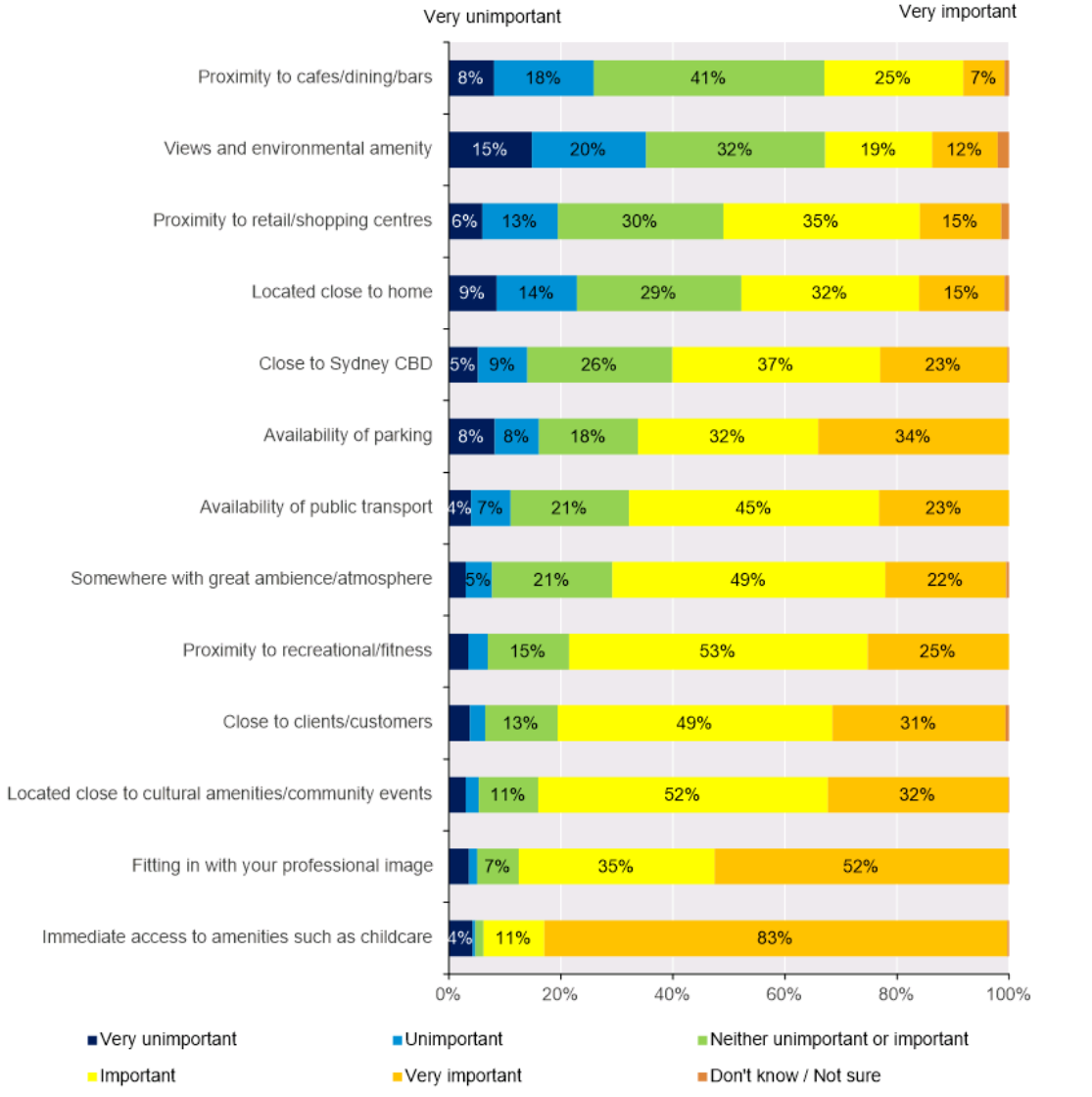
In addition, a survey was undertaken of office workers in the North Sydney Centre in 2013 to ascertain views on North Sydney as an office market and inform what could be done to improve the attractiveness of the centre.

The following chart outlines the importance of office location characteristics to the appeal of a centre to office workers. It is interesting to note that the factors identified as 'very important' by over half of respondents include 'immediate access to amenities such as childcare' and 'fitting in with professional image'.

The results indicate that while transport accessibility and parking is an important consideration for workers, staff are willing to travel if the location has access to amenities and is good for their professional image and networks.

Attributes Important to the Appeal of an Office Location Area

Office Workers Chart 4.2



Source: Urbis

5. PARRAMATTA CBD RESIDENT & WORKER PROFILE

This section provides a demographic overview of the Parramatta CBD including resident and worker populations.

5.1. RESIDENT PROFILE

The resident profile is based on a catchment developed of travel zone areas as well as Statistical Area – level 1 (SA1) areas that encompass the Parramatta City Centre. Due to different boundaries, the catchment does not exactly match the Parramatta CBD boundary.

5.1.1. Historical and Forecast Population Growth

Table 5.1 presents the current population of the Parramatta City Centre and the forecast growth to 2036, benchmarked against the Sydney Metropolitan region.

As at 2016, the population in the Parramatta City Centre was 16,555. The population in the City Centre is expected to reach 41,581 by 2036, equating to average annual growth of 4.7% per annum. The projected growth equates to around 1,250 additional residents per annum, requiring total dwelling growth of around 11,000 dwellings.

Growth in the Parramatta City Centre is expected to be considerably higher than the Sydney average in the forecasted period, where the Sydney Metropolitan region's projected average growth rate is 1.6% per annum.

Historic Population Growth and Forecasts

PARRAMATTA CITY CENTRE, 2011 - 2036 TABLE 5.1

	Population Forecast					
	2011	**2016**	**2021**	**2026**	**2031**	**2036**
Parramatta City Centre	12,071	16,555	22,676	28,357	34,445	41,581
Sydney Metropolitan	4,286,200	4,681,950	5,106,300	5,537,850	5,975,550	6,421,850

	Forecast Growth (No.)				
	2011-16	**2016-21**	**2021-26**	**2026-31**	**2031-36**
Parramatta City Centre	897	1,224	1,136	1,218	1,427
Sydney Metropolitan	79,150	84,870	86,310	87,540	89,260

	Forecast Growth (%)				
	2011-16	**2016-21**	**2021-26**	**2026-31**	**2031-36**
Parramatta City Centre	6.5%	6.5%	4.6%	4.0%	3.8%
Sydney Metropolitan	1.8%	1.8%	1.6%	1.5%	1.5%

Source: NSW Department of Planning & Environment, Bureau of Transport Statistics September 2016 Release; Urbis

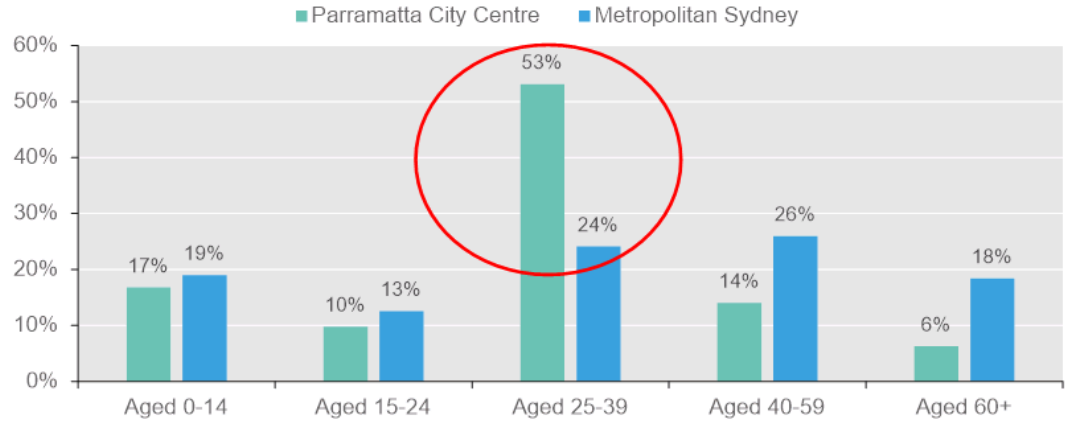
5.1.2. Age Distribution

Chart 5.1 presents the population age distribution for residents in Parramatta City Centre and the Sydney Metropolitan region. Relative to Sydney, the Parramatta City Centre has a considerably higher proportion of residents aged between 25-39 year (53% compared to 24%) and a lower proportion of residents in all other aged cohorts.

The age distribution highlights the large number of young professionals that are living in the Parramatta City Centre. The increased residential density around the City Centre increases the number of resident workers that could work in the CBD.

Population Age Distribution

Parramatta City Centre and Metropolitan Sydney, 2016 Chart 5.1



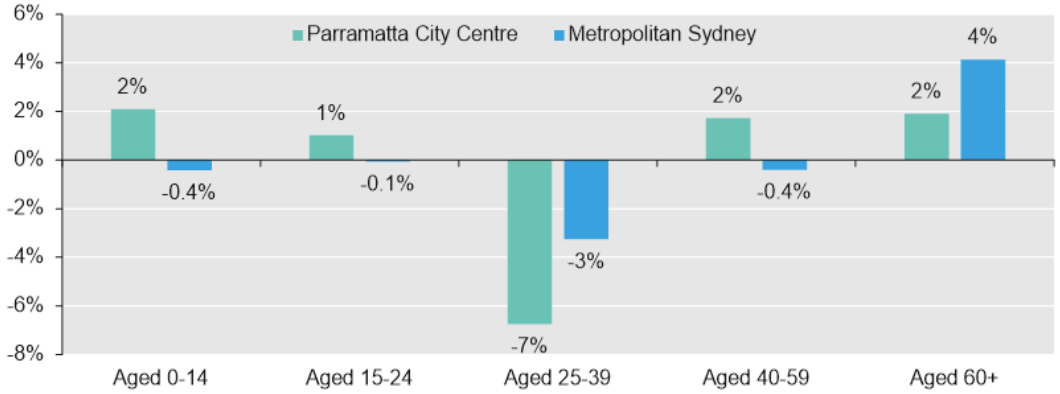
Source: ABS Census 2016; NSW Department of Planning; Urbis

Chart 5.2 shows the projected change in the population age distribution of the Parramatta City Centre and Sydney to 2036. Due to the limited availability of information at a SA1 level, the City of Parramatta LGA growth rates have been used as a proxy to determine the projected age distribution for the Parramatta City Centre.

While the population in the area is expected to grow, the age distribution of the area is expected to shift. Specifically, the proportion of residents aged over 60 is expected to increase, following a city wide trend, and the number of residents aged 0-14 is expected to increase at a similar rate. In contrast, the proportion of residents aged between 25 and 39 is expected to fall and this is expected to be greater for residents within the Parramatta City Centre.

Change in Population Age Distribution

Parramatta City Centre and Metropolitan Sydney, 2016 to 2036 Chart 5.2



Source: ABS Census 2016, NSW Department of Planning; Urbis

5.1.3. Incomes

Table 5.2 presents the household income distribution for residents of the Parramatta City Centre compared to the Sydney Metropolitan region. Chart 5.3 following, shows this variation of average household income of Parramatta City Centre against the Sydney average.

Incomes within the Parramatta City Centre are comparatively lower than the Sydney Statistical Division, with a skew of households earning salaries in the middle to high income bracket (between $52,000 and $130,000 per annum).

Overall, the Parramatta City Centre incomes are approximately 4% lower than average household incomes across Sydney. The difference in average household income has narrowed over the decade from a difference of 19% in 2006 to 4% in 2016, reflecting the increasing proportion of white collar professionals residing within the Parramatta City Centre. This highlights the shift towards more professional workers living in the area, which provides a larger pool of potential workers for large corporations looking to establish and expand operations in the Parramatta CBD.

Household Income Distribution

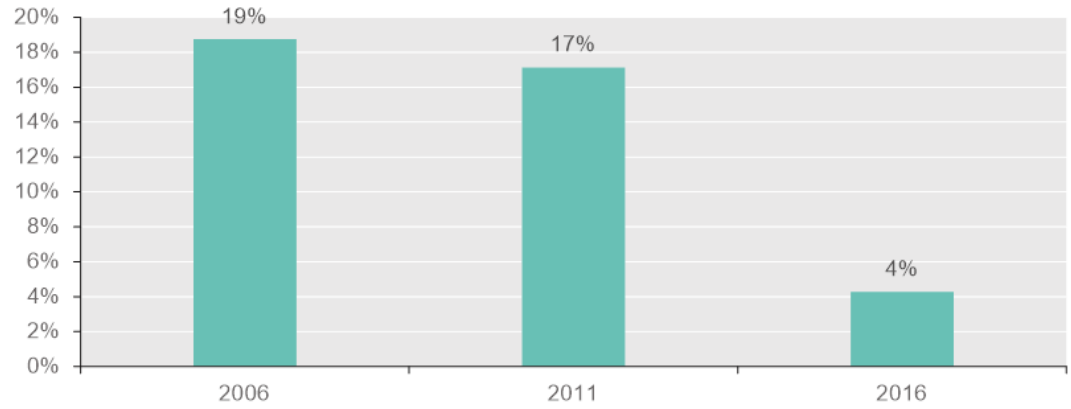
PARRAMATTA CITY CENTRE AND SYDNEY, 2016 TABLE 5.2

Gross Annual Household Income	Parramatta City Centre	Sydney
$Neg/Nil	3%	2%
$1-$7,800	1%	1%
$7,800-$15,600	2%	2%
$15,600-$20,800	2%	3%
$20,800-$26,000	3%	5%
$26,000-$33,800	3%	4%
$33,800-$41,600	4%	6%
$41,600-$52,000	5%	6%
$52,000-$65,000	8%	8%
$65,000-$78,000	8%	7%
$78,000-$91,000	8%	6%
$91,000-$104,000	10%	6%
$104,000-$130,000	17%	12%
$130,000-$156,000	8%	8%
$156,000-$182,000	6%	6%
$182,000-$208,000	5%	6%
$208,000 plus	7%	12%
Average Household Income	$101,962	$106,502

Source: ABS Census 2016; Urbis

Parramatta City Centre Residents' Household Income Variation to Sydney

2006, 2011 and 2016 Chart 5.3



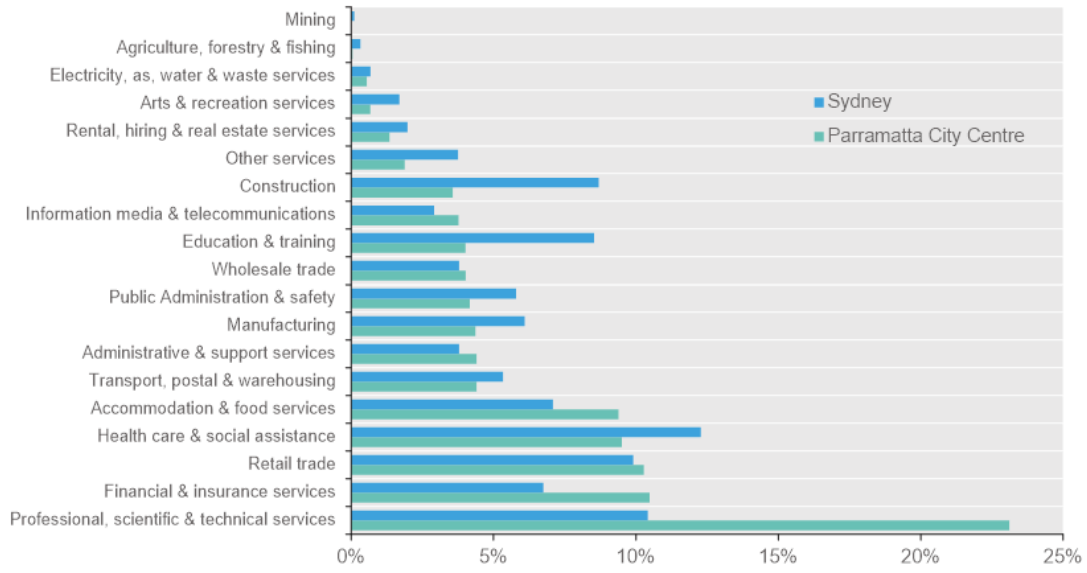
Source: ABS Census; Urbis

5.1.4. Industry of Employment

Chart 5.4 shows the industry distribution of employment for Parramatta City Centre and Sydney residents based on the ABS Census 2016. In terms of the Parramatta City Centre, approximately 80% of working residents are engaged in white collar professions compared to the Sydney average of 75%. This highlights the importance of office precincts to local residents in providing them greater options to work close to where they live.

Industry of Employment

Parramatta City Centre and Sydney, 2016 Chart 5.4



Source : ABS Census 2016; Urbis

5.2. EMPLOYEE PROFILE

The employee profile is based on the Parramatta City Centre as defined by TPA.

5.2.1. Industry of Employment

Chart 5.5 shows the industry distribution of employment for workers who work within the Parramatta City Centre and Sydney. Workers that work within the Parramatta City Centre are more likely to work in white collar professions compared to the Sydney average. The key workforce areas for the City of Parramatta CBD include people working in:

- *Public Administration and Safety:* Which reflects the significant presence of State Government agencies in the Parramatta City Centre
- *Financial and Insurance Services:* Major finance institutions such as Commonwealth Bank, IAG, QBE and AON have offices in the City Centre
- *Health Care and Social Assistance:* Medical centres such as Argyle Street Medical Centre, Parramatta Community Health Centre, Centrelink and Medicare
- *Professional, Scientific and Technical Services:* Several accounting, legal and other professional services have offices in the City Centre.

Parramatta CBD Workers' Industry of Employment

Parramatta City Centre and Sydney, 2016 — Chart 5.5

Industry	Parramatta City Centre	Sydney Workers
Public Administration and Safety	22%	8%
Financial and Insurance Services	15%	27%
Health Care and Social Assistance	9%	3%
Professional, Scientific and Technical Services	8%	23%
Retail Trade	7%	5%
Education and Training	6%	3%
Accommodation and Food Services	5%	7%
Construction	5%	3%
Administrative and Support Services	4%	5%
Other Services	3%	2%
Electricity, Gas, Water and Waste Services	2%	1%
Inadequately described	2%	2%
Transport, Postal and Warehousing	2%	2%
Rental, Hiring and Real Estate Services	2%	3%
Manufacturing	2%	1%
Wholesale Trade	2%	1%
Not stated	2%	1%
Information Media and Telecommunications	1%	4%
Arts and Recreation Services	1%	1%
Agriculture, Forestry and Fishing	0%	0%
Mining	0%	0%
Not applicable	0%	0%

Source: 2016 ABS Census; Bureau of Transport Statistics; Urbis

5.2.2. Place of Residence / Journey to Work

Chart 5.6 shows the place of residence of people who work within the Parramatta City Centre. A significant proportion of Parramatta CBD workers reside in Blacktown and Parramatta LGAs, within relatively close proximity to their place of work. This is an important factor for businesses operating out of Parramatta as Blacktown and Parramatta have a high proportion of white collar workers for these businesses to draw on. The majority of workers come from Western Sydney highlighting the importance of Parramatta as the commercial centre for the region.

A large volume of workers also reside in a wide variety of locations throughout Sydney and are dependent on public transport links to connect them to Parramatta City Centre. The journey to work analysis highlights the importance of good public transport accessibility to facilitate the movement of workers and make the CBD attractive to major corporations and their workers.

Parramatta City Centre Workers' Place of Residence

2016 Chart 5.6

Parramatta City Centre Workers - Place of Residence

LGA	Number	%
Parramatta	10,190	17%
Blacktown	8,660	15%
Cumberland	6,120	10%
Penrith	4,201	7%
The Hills Shire	3,831	7%
Fairfield	2,779	5%
Canterbury-Bankstown	2,716	5%
Liverpool	2,504	4%
Hornsby	1,577	3%
Campbelltown	1,435	2%
Inner West	1,409	2%
Balance	13,440	23%
Total	**58,862**	**100%**

Source: 2016 ABS Census; Urbis

6. PARRAMATTA CBD OFFICE DEMAND FORECASTS

This section assesses the likely future demand for office floorspace in the Parramatta CBD, taking into account projected white collar employment growth and competition in other key centres.

6.1. EMPLOYMENT PROJECTIONS

This section assesses forecasted jobs growth as a basis for projecting future office demand. Jobs growth is assessed at the Travel Zone level as defined by TPA. Projected jobs growth for competing commercial centres is also reviewed, to set some context to the Parramatta City Centre forecasts, and provide a basis for establishing Parramatta's future role within the hierarchy of centres.

Job growth forecasts are based on TPA 2016 release and are presented in Table 6.1. The Parramatta City Centre accommodated around 40% of all jobs in Parramatta LGA in 2016, and this proportion is expected to increase to 44% by 2036.

From these official forecasts prepared by the TPA, it is apparent the following sectors are likely to have a significant influence on the evolution of Parramatta City Centre:

- Public Administration & Safety (+9,483 jobs)
- Retail Trade (+7,299 jobs)
- Financial & Insurance Services (+4,631 jobs).

This reflects the potential for the City Centre to continue to grow as an administrative and commercial centre for Greater Western Sydney. It is noted that the retail forecast seems bullish as it equates to a tripling in the number of retail jobs in the city centre.

Overall, there is projected to be around 50,400 office based jobs in the City Centre by 2036, which is slightly higher than the previous forecast (2014 TPA forecasts) of 50,000.

It is noted, that there is potential that the TPA numbers do not fully factor in the shift that might occur as a result of a new Metro Rail connection and benefits from the Second Sydney Airport. As such, future employment growth could exceed these projections.

Employment Projections by Industry

PARRAMATTA CITY CENTRE, 2011 TO 2036 TABLE 6.1

	Historic				Forecast									
	2011		2016		2021		2026		2031		2036		2011-2036	
Industry Sector	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**Total Change**	**Annual Growth %**
Public Administration and Safety	12,110	26%	13,521	26%	14,732	25%	16,618	24%	19,405	25%	21,593	25%	9,483	2.3%
Retail Trade	3,850	8%	4,075	8%	5,353	9%	8,257	12%	9,456	12%	11,149	13%	7,299	4.3%
Financial and Insurance Services	9,082	19%	10,313	20%	11,386	19%	12,070	17%	12,840	17%	13,714	16%	4,631	1.7%
Health Care and Social Assistance	3,005	6%	3,466	7%	4,215	7%	5,107	7%	5,777	7%	6,553	8%	3,547	3.2%
Professional, Scientific and Technical Services	3,956	8%	4,632	9%	5,233	9%	5,847	8%	6,610	9%	7,475	9%	3,519	2.6%
Accommodation and Food Services	2,377	5%	2,575	5%	2,927	5%	3,725	5%	4,057	5%	4,509	5%	2,132	2.6%
Administrative and Support Services	2,860	6%	2,573	5%	3,200	5%	3,850	6%	4,114	5%	4,437	5%	1,577	1.8%
Construction	1,297	3%	1,423	3%	1,666	3%	1,994	3%	2,188	3%	2,409	3%	1,112	2.5%
Education and Training	1,073	2%	1,185	2%	1,412	2%	1,725	2%	1,934	3%	2,158	3%	1,085	2.8%
Other Services	1,005	2%	1,120	2%	1,294	2%	1,693	2%	1,862	2%	2,082	2%	1,077	3.0%
Electricity, Gas, Water and Waste Services	1,853	4%	1,836	4%	2,198	4%	2,365	3%	2,547	3%	2,645	3%	792	1.4%
Rental, Hiring and Real Estate Services	907	2%	1,066	2%	1,173	2%	1,278	2%	1,403	2%	1,558	2%	651	2.2%
Information Media and Telecommunications	1,022	2%	1,076	2%	1,153	2%	1,390	2%	1,499	2%	1,652	2%	630	1.9%
Arts and Recreation Services	223	0%	253	0%	335	1%	453	1%	550	1%	661	1%	439	4.4%
Wholesale Trade	391	1%	406	1%	464	1%	585	1%	634	1%	712	1%	320	2.4%
Transport, Postal and Warehousing	849	2%	811	2%	910	2%	1,046	2%	1,099	1%	1,167	1%	318	1.3%
Unclassified	773	2%	723	1%	842	1%	948	1%	979	1%	1,020	1%	247	1.1%
Mining	57	0%	66	0%	68	0%	69	0%	70	0%	70	0%	13	0.8%
Agriculture, Forestry and Fishing	23	0%	22	0%	25	0%	31	0%	31	0%	31	0%	8	1.3%
Total Employment	**46,713**	**100%**	51,142	**100%**	58,588	**100%**	69,051	**100%**	77,057	**100%**	85,595	**100%**	**38,881**	**2.5%**
White Collar Employment	**35,244**	**75%**	39,206	**77%**	44,135	**75%**	50,032	**72%**	55,995	**73%**	61,883	**72%**	**26,640**	**2.3%**
Office Based White Collar Employment	**29,937**	**64%**	33,181	**65%**	36,877	**63%**	41,054	**59%**	45,872	**60%**	50,429	**59%**	**20,492**	**2.1%**

Source: TPA 2016 Release; Urbis

Table 6.2 illustrates projected office-based white collar employment growth for key competing commercial centres – Sydney CBD, Macquarie Park / North Ryde, North Sydney, St Leonards / Crows Nest and Chatswood.

Sydney CBD is expected to attract an additional 69,000 office based jobs by 2036 the largest increase of the commercial centres. Parramatta City Centre is also expected to attract a large number of office based jobs by 2036 (the second largest of the comparable commercial centres).

Macquarie Park / North Ryde is expected to attract an additional 7,000 office based jobs by 2036 – the largest increase of the North Shore commercial centres. This is not surprising given that the centre is less constrained, in terms of development potential, than North Sydney due to the large number of available development sites.

Based on around 720,000 sq.m of office space in January 2019 and an estimated 34,700 office based workers in 2019, there is a ratio of around 21 sq.m of office floorspace per worker.

Competing Commercial Centres

OFFICE BASED WHITE COLLAR EMPLOYMENT PROJECTIONS, 2016 TO 2036 TABLE 6.2

Centre	2016	2021	2026	2031	2036	Total Change	Annual Growth %
Sydney CBD	172,210	198,017	209,927	224,512	241,819	69,609	1.7%
Parramatta City Centre	33,181	36,877	41,054	45,872	50,429	17,248	2.1%
Macquarie Park / North Ryde	21,770	23,992	25,508	27,313	29,159	7,388	1%
North Sydney	16,326	17,960	19,024	20,259	21,658	5,332	1%
St Leonards / Crows Nest	17,602	18,326	18,967	19,674	20,378	2,776	1%
Chatswood	11,571	12,467	13,134	13,658	14,173	2,601	1%

Source: TPA 2016 Release; Urbis

6.2. OFFICE DEMAND FORECASTS

This section assesses the future demand for office space in Parramatta City Centre, drawing on the job projections contained in the preceding sections.

To note, white collar employment growth from 2016 to 2036 is expected to be almost 2.1% per annum (as presented in Table 6.2), which is above Sydney's white collar employment growth of just 1.7% within the forecast period.

Of the 34,450 new jobs forecast to be located in Parramatta City Centre from 2016 to 2036, around 17,250 are expected to be office based, with the balance being located in retail, construction, health and other accommodation.

Table 6.3 illustrates the forecast demand for office space. Based on the existing office space ratio of 21 sq.m NLA per employee this would generate demand for an additional 379,500 sq.m of office space in Parramatta City Centre from 2016 to 2036. It is noted that there is a trend towards the more efficient use of office space as a result of the move towards open plan office layouts. This has resulted in new office buildings generally having a lower ratio of around 15 sq.m of office floorspace per worker. Assuming the lower floorspace requirement, employment growth would generate demand for an additional 258,700 sq.m of office space in Parramatta City Centre from 2016 to 2036.

As discussed, there is potential for employment growth to exceed TPA forecasts based on uplift from the proposed West Metro and the growth in the second Sydney airport. As additional 5,000 office jobs would equate to demand for an additional 75,000 to 105,000 sq.m of office space.

Office Demand Forecasts

PARRAMATTA CBD, 2016 TO 2036 TABLE 6.3

	2016	2021	2026	2031	2036
Office-Based White Collar Workers	33,181	36,877	41,054	45,872	50,429
	2011-16	**2016-21**	**2021-26**	**2026-31**	**2031-36**
Additional Office-Based White Collar Workers - Cumulative		3,696	7,873	12,691	17,248
Forecast Office Demand (NLA sq.m) - Cumulative (15 sq.m per worker)		55,442	118,094	190,361	258,718
Forecast Office Demand (NLA sq.m) - Cumulative (21 sq.m per worker)		77,618	165,332	266,505	362,206

Source: TPA 2016 Release; NSW Department of Planning; Urbis

7. CONSULTATION

Urbis undertook consultation in 2015 with commercial office owners and developers active in Parramatta to inform the assessment of the potential for mixed-use development in the Parramatta CBD and the attraction of A-Grade office space. The key themes emerging from the discussions are outlined in Appendix A.

Key changes that have occurred since the consultation was undertaken include:

- Parramatta Office Market
  - Participants in 2015 mentioned that the Parramatta Square development has the potential to act as a catalyst for additional office development through the attraction of major corporate tenant(s) such as one of the major banks. However, the development of significant office space for one tenant increases the risk and discount rates associated with the development. This has proven to be true with NAB having precomitted to 40,000 sq.m in Parramatta Square
  - Several major businesses and government agencies are looking for office space within the Parramatta CBD with requirements for around 10,000 sq.m each. Government pre-commitments would be the most attractive to potential developers as they are usually on longer lease periods that reduce the risk associated with the project. The NSW government is increasing its office commitments in Parramatta include 25,000sqm of leased office space at 105 Phillip St, Parramatta, occupied by the Department of Education, and 65,000sqm of office space at 4 Parramatta Square, to be occupied by the departments of Planning & Environment, Industry, and Finance, Services and Innovation, commencing in late 2019
  - Office tenants are looking to move away from business park locations to CBD locations to take advantage of better amenity and transport linkages that improve key staff retention and attraction. This represents a reversal after a large number of companies moved away from CBDs to business parks (such as Macquarie Park and Norwest) in the last 20 years. Consolidation is occurring such as the Commonwealth Bank of Australia consolidating offices in Sydney Olympic Park and Parramatta to the Australian Technology Park
  - There was consensus from participants that A-Grade office buildings of between 20,000 to 25,000 sq.m represent the most viable size for the Parramatta CBD. It was mentioned that larger developments of 40,000 sq.m or more, such as what is proposed in Parramatta Square, represent a risk to developers and owners as there are not many tenants capable of accommodating that quantum of space. This can result in significant vacancies if the original tenant moves out in the future. It is noted that in recent years the NAB has precommitted to 40,000 sq.m in Parramatta Square and the NSW Government has taken up large amounts of office space, though the number of potential tenants that can take these size commitments are limited.
- Constraints of Mixed-Use Development
  - The strata titling of residential apartments was a major concern to office owners as they lose full control of the building and site. It is noted that build-to-rent has emerged in recent years as a new residential asset type that could alleviate this issue by keeping ownership in one line.
- Attractiveness of Mixed-Use Development
  - Multiple participants believed residential apartments (in the 2015 market) could underpin the viability of the development to the point where the commercial office component is developed speculatively. Some participants even believed residential focussed developers could justify projects through the sale of the residential apartments even if most of the office space remained vacant. The residential market has softened significantly since 2015, indicating how cycles change with office development now significantly more viable.

- Attracting A-Grade Office to Parramatta CBD
  - It is difficult for Council to influence the demand for office buildings unless there is a pre-commitment to space by a tenant. Consequently, Council's most effective method of facilitating office development is through reducing development costs
  - City of Parramatta could utilise Council-owned landholdings such as carpark sites to facilitate office development.

8. MIXED USE CASE STUDIES

8.1. CASE STUDIES

The following case studies provide examples of mixed-use developments that have comprised a significant amount of residential apartments and office floorspace as well as other uses. This analysis has been undertaken to understand how mixed use development may be accommodated within the Commercial Core. Mixed-use developments can be either:

- Vertically separated: Buildings with multiple uses contained in the same building. These projects are relatively rare due to some of the potential conflicts between commercial and residential uses in the same building

- Horizontally separated: Developments with multiple buildings on the same site with office and residential uses generally contained in separate buildings. These developments are generally located on much larger sites and often have a podium/piazza of retail/ commercial uses to integrate the development.

The following case studies draw on a range of mixed use developments within Australian CBD locations.

Project Name **Riparian Plaza**	
DEVELOPER	Bloomberg Incorporation Limited
ADDRESS	71 Eagle Street, Brisbane
LOCATION CHARACTERISTICS	The subject site is located on the eastern end of the Brisbane CBD on the Brisbane River. The site is located adjacent to the Eagle Street Pier ferry stop and about 500m south-west of the Central Train Station.
COMPLETED	October 2005
PROPERTY DESCRIPTION	The Riparian Plaza is a 53-storey mixed use building, with 11 car park levels from the ground up, 25 commercial levels and 12 residential levels originally housing 50 penthouse apartments. Plant rooms and recreational facilities are located on the other levels. The building has a total floor area of approximately 55,000 sq.m.
COMMERCIAL	The premium commercial office is located over 25 levels with a GLA of 30,500 sq.m and floorplate of around 1,200 sq.m.
RESIDENTIAL	50 apartments on the upper 12 levels. The apartments are prestige properties and have attached a high proportion of affluent owner occupiers.
BUILT FORM	Riparian Plaza was designed by architect Harry Seidler. Most office spaces have river views, due to the 45-degree angle to the river. Each penthouse has its own curvilinear, projecting terrace that faces the river. The cantilevering balconies have a highly sculptured shape and it is not immediately evident that they are balconies.
FUNDING MECHANISM	Bloomberg developed the project with the intention of owning the office space and selling the apartments off-the-plan. Construction commenced in January 2002 with the aim of completing construction by September 2003. Significant project delays meant the project wasn't finished until late 2005. 75% of the residential apartments had been sold by January 2003. In November 2001, law firm Clayton Utz announced it would be taking up almost 20% of Riparian's 25,000sq m of commercial office space. Clayton Utz was the only company publicly announcing they had pre-committed to the building before construction started. It is understood other companies had pre-committed to the project before construction started though overall pre-commitments were relatively low with a relatively high level of speculation.
VIABILITY OF USES	The office component represented the majority of the project and was critical to the viability of the development. While the residential apartments were a prestige product, the construction cost associated with developing additional floors meant the residential component did not significantly improve the viability of the project.
OFFICE TENANTS	Major office tenants include KPMG, Bank of Communications, Bloomberg, Clayton Utz, Clean Energy Finance Corporation, Morgan Stanley, Telstra, Servcorp.

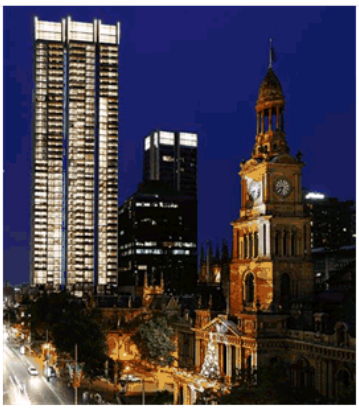
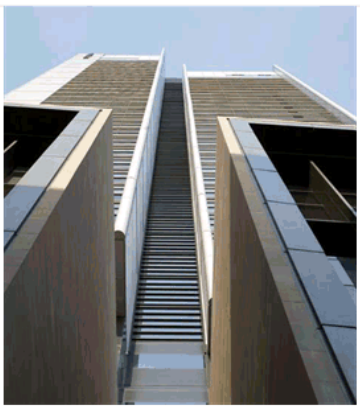
MARKET CONDITIONS AT DEVELOPMENT	Vacancy rates for A-Grade and premium office space in the Brisbane CBD had declined from a peak of around 10% in early 1997 down to around 3% in early 2000, when the project was in the planning phase. Riparian Plaza provided the first, new, premium office space available in the Brisbane CBD for a decade. Brisbane Square completed in 2006, was the next major office building constructed in Brisbane. Residential apartment price growth in Brisbane had been relatively stagnant from 1998 to 2002. Despite the limited price growth, the project was targeted at the luxury market, with an aim to create a new market for Brisbane. The Australian economy had recorded strong growth in the late 1990s averaging gross domestic product growth of over 4% per annum. As the project was in the final planning phase, the economy slowed down in 2000/01 with growth of around 2%.
KEY LEARNINGS FOR PARRAMATTA CBD	Riparian Plaza is an example of commercial office and residential being located in the same building in a CBD location. The development has been designed to a premium standard and comprises prime office space and luxury penthouse apartments. The high residential standard reduces the issues of 'laundry drying on the balcony' that has been cited as having the potential to reduce the attractiveness of the area to commercial tenants. It is anticipated that this type of development would not be suitable for the Parramatta CBD as the premium quality and prestige residential is more suited to a major CBD location. The development is considered to be a 'one off' with the premium location and architecture critical to its success.

Project Name **Conservatory on Hindmarsh Square**	
DEVELOPER	Hines Property
ADDRESS	131-139 Grenfell Street, Adelaide
LOCATION CHARACTERISTICS	The site is located in the Adelaide CBD, overlooking Hindmarsh Square
COMPLETED	July 2009
PROPERTY DESCRIPTION	The Conservatory development on Hindmarsh Square is a 19-level building comprising 430 sq.m of ground floor retail space, four floors of above-ground parking, five floors of office space and nine floors of residential development. Construction of the building commenced in October 2007.
COMMERCIAL	The office accommodation is located on levels 5 to 9 with approximately 4,500 sq.m of space on a 900 sq.m floorplate.
RESIDENTIAL	Includes 53 apartments on the top 10 floors of the development.
BUILT FORM	The office accommodation is serviced by three elevators with an exclusive office lobby on Grenfell Street. Residential occupants utilise separate elevators via the residential entrance off Hindmarsh Square. The different components of the building are easy to identify with the façade of the parking, commercial and residential uses easy to differentiate. The balconies on the residential component are quite obvious that may reduce visual amenity to nearby buildings.
FUNDING MECHANISM	The office component involved a pre-commitment of all the space to the South Australian Government's Minister of Infrastructure for a 10-year lease term with a five-year option. Later on, an expression of interest campaign was undertaken by CBRE starting in June 2009 (shortly before the completion of the building) to sell the office component. Before site works began in June 2007, the project had achieved apartment presales of 60%, which indicates limited speculation associated with the development. Approximately 90% of the residential apartments had been sold off the plan as at January 2009, six months before the completion of the project. This indicates that after the presale requirements for financing of around 50-60% was achieved, the developer did not need to sell the apartments as fast and around one sale per month over the next 18 months were achieved.

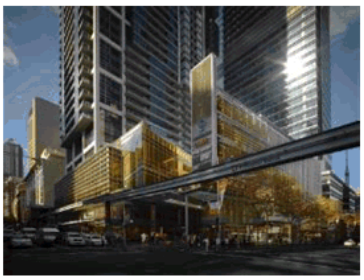
VIABILITY OF USES	The development took a long time to commence with planning for the project commencing in the early 2000s and declared a Major Project by the State Government in 2003 due to its capacity to deliver a significant environmentally sustainable high-rise residential building in the Adelaide city core. The sales launch of the apartments commenced on July 22, 2006 with site demolition starting in June 2007 and construction commencing in October 2007. It is understood that one of the delays in the project was the problem with securing a pre-commitment for the office space. Eventually, the office component involved a pre-commitment of all the space to the South Australian Government's Minister of Infrastructure. Despite the office space accounting for around a third of the building floorspace, a pre-commitment was still required to commence construction.
OFFICE TENANTS	As the South Australian Government's Minister of Infrastructure lease term is coming to an end, the office building will be vacant from the first quarter of 2020.
MARKET CONDITIONS AT DEVELOPMENT	Economic growth in Australia increased from a low of 2% in 2000/01 to 4.2% in 2003/04 and remained over 3% during the planning phase of the project. The Global Financial Crisis began in the USA in around July 2007, shortly after the works began on the site. It took a few months for the 'credit crunch' to reach Australia, which meant the initial funding for the project wasn't impacted. The office market in the Adelaide CBD had been relatively stagnant with no net growth in office space between 1998 and 2006. Vacancy rates remained relatively stable at around 9-11%, indicating no major demand for additional space. Vacancy rates fell to around 6-7% in 2006 and 2007, which may have helped to secure a pre-commitment for the building. The Adelaide apartment market recorded strong price growth from 2001 to 2005, when the project was in its initial planning phase. Price growth plateaued in 2005 and 2006, with sales for the project commencing in mid 2006.
KEY LEARNINGS FOR PARRAMATTA CBD	The Conservatory is an example of commercial office and residential being located in the same building in a CBD location. The balconies on the residential component may have an impact on adjacent office buildings. Each component of the development (retail, parking, office and residential) has distinct design characteristics, which means the building does not look like an integrated development. The strata nature of the building also 'locks' the site for a minimal office gain of only 4,000 sq.m The project only included around 4,000 sq.m of office space with a floorplate of 900 sq.m, which is generally lower than what is included in A-Grade office buildings. Despite the relatively small office component, the project still required a 100% office pre-commitment from the State Government to be developed.

PROJECT NAME **ST LEONARDS FORUM**	
DEVELOPER	Winten Group
ADDRESS	201 Pacific Highway, St Leonards
LOCATION CHARACTERISTICS	The Forum is located in St Leonards, approximately 5km north-west of the Sydney CBD. The development is built directly over St Leonards train station and represents a transport orientated development.
COMPLETED	Stage 1: Forum – Completed in 2000 Stage 2: Forum West - Completed in 2002
PROPERTY DESCRIPTION	The Forum is an example of a horizontal mixed-use development with separate commercial and residential buildings connected by a retail podium. The Forum comprises three commercial office buildings with over 32,000 sq.m of office space, two residential towers containing 773 apartments, a Coles supermarket and 34 food and retail shops. The buildings surround a large open plaza incorporating retail, the Station concourse and public space.
COMMERCIAL	The A-Grade commercial office is located over 25 levels with 32,000 sq.m and floorplate of around 1,200 sq.m.
RESIDENTIAL	Forum Tower is a 38 storey residential building with 483 apartments. Forum West is a 25 storey residential building with 290 apartments.
BUILT FORM	The Forum was designed by PTW Architects and was planned as a town centre. The residential apartments have open balconies, which has the potential to negatively impact the adjacent office tenants.
FUNDING MECHANISM	Winten Property Group structured the project so that the non-residential components could be sold at a later date. Winten Property Group sold the first two office buildings (fully leased) to Challenger International in October 2000 for around $155 million. The Forum West office building was sold by Winten Property Group in 2004 to Manchester Unity (with rental guarantees), which had its headquarters in the building. The residential apartments were marketed by Winten Property Group and started selling off the plan in 1998.
VIABILITY OF USES	Residential apartments started selling off the plan in 1998 and recorded relatively strong sales. As at February 2002, 235 out of 290 apartments in the Forum West development had been sold off-the-plan, with the development completed in mid-2002. Pre-commitments were secured for the office components of the development with the first two buildings in Stage 1 fully leased by Cisco Systems and UUnet. The pre-commitments were required before construction commenced.
OFFICE TENANTS	Pre-commitments were secured for the office components of the development with the first two buildings in Stage 1 fully leased by Cisco Systems and UUnet. The

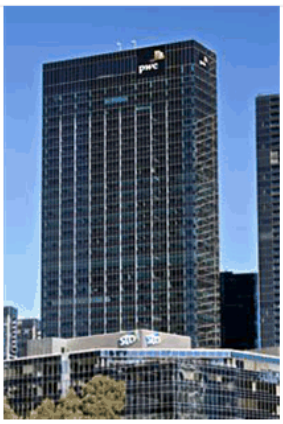
	development initially attracted technology companies, which matched the business mix in the St Leonards/Gore Hill area. In recent years, St Leonards has struggled as an office centre with increased competition from nearby centres such as North Ryde and Macquarie Park. This has resulted in office vacancies and buildings being converted to residential. Medical group Primary Health Care moved into 4,164 sq.m of space in August 2015 on a seven year lease with an annual rent of about $470/ sq.m. This reflects the strength of the area as a medical hub surrounding the Royal North Shore Hospital.
MARKET CONDITIONS AT DEVELOPMENT	The office vacancy rate in Crows Nest/ St Leonards fell from a high of 15.5% in July 1992 to 2.8% in July 1998 when the project was commencing construction. Upon completion of the office development, the whole office component was tenanted, which resulted in the vacancy rate falling to 1.1% in 2001. Following the recession in the early 1990s, the Australian economy recorded strong growth averaging 4% per annum between 1993 and 1998, while the project was in the planning phase. This created a strong environment for investment in St Leonards.
KEY LEARNINGS FOR PARRAMATTA CBD	The Forum has been a relatively successful mixed-use development in proximity to a major train station. The development tried to build critical mass to establish the St Leonards centre though has experienced competition from other centres such as North Ryde and Chatswood. The St Leonards Centre is relatively long and stretches along the Pacific Highway. This has similarities to the Auto Alley precinct in Parramatta which extends a significant distance from the core Parramatta CBD. The development is an example of how a mixed use development can be successfully developed next to a key transport node with a mix of retail, residential and office uses. There could be a potential for greater density above the train line around the Parramatta Train Station.

Project Name **Lumiere**	 
DEVELOPER	Frasers Property
ADDRESS	501 George Street, Sydney
LOCATION CHARACTERISTICS	The subject site is located adjacent Town Hall in Sydney's mid-town precinct. It is opposite St Andrew's Cathedral and HSBC Centre.
COMPLETED	December 2007
PROPERTY DESCRIPTION	Lumiere is a 56 level residential and commercial building. It has a five level podium with three levels of retail space called Regent Place and one level of office suites called Lumiere Commercial. Lumiere Residences has 456 apartments built above the Regent Place podium.
COMMERCIAL	Lumiere Commercial has 19 office suites with a NLA of 1,400 sq.m.
RESIDENTIAL	Lumiere Residences has 456 apartments over 41 levels.
BUILT FORM	Lumiere was designed by Foster and Partners as a sustainable, high-density urban form combining home, work, commerce and leisure in the heart of Sydney's CBD. Residential towers are built on top of a sandstone-faced podium which offers a variety of retail amenities. The apartments have winter gardens instead of balconies. A 50m swimming pool is suspended over the lobby.
FUNDING MECHANISM	Residential dominated the project with apartments sold off-the-plan prior to construction commencing in early 2005. As of February 2007, 230 apartments had been sold, equating to slightly more than half of the project. This indicates that the project was speculative in nature when construction commenced, with less well below 50% pre-commitments. It is noted that the project occurred prior to the Global Financial Crisis, when funding was less restrictive. Since the completion of the development, Frasers Property has sold some office tenancies.
VIABILITY OF USES	The 1,400 sq.m of office space was relatively insignificant in the overall financial viability of the development. The office tenancies were leased once the development was completed, which is typically the case for small office spaces.
OFFICE TENANTS	Frasers Property and other smaller professional services firms have offices within Lumiere.

MARKET CONDITIONS AT DEVELOPMENT	The Lumiere building was completed in 2007, before the Global Financial Crisis significantly impacted the development sector. Economic growth in Australia increased from a low of 2% in 2000/01 to 4.2% in 2003/04 and remained over 3% during the planning phase of the project. The Sydney CBD office market recorded significant development between July 2004 and July 2006, with over 300,000 sq.m completed. This resulted in an increase in vacancy rates to around 9% in July 2006, indicating the market was around equilibrium. The residential apartment market in Sydney peaked in around 2004 after a sustained period of strong price growth since 1996. Prices declined in 2005 and 2006 before the Global Financial Crisis continued the period of no growth.
KEY LEARNINGS FOR PARRAMATTA CBD	Lumiere has been designed to a high quality with extensive use of tinted glass in the façade. This creates an 'androgynous' feel to the building with some difficulty in determining whether it is a residential or commercial building from first glance, a deliberate design element to allow the building to fit in with the surrounding commercial building forms. The use of winter gardens improve the built form of the residential component and reduce visual amenity issues on surrounding office buildings such as laundry being placed on balconies. While the development is mixed use, it did not provide A-Grade office space and is primarily a residential building. The 1,400 sq.m is small offices, which is not what the Parramatta CBD requires.

Project Name **World Square**	
DEVELOPER	Multiplex (now Brookfield Multiplex), Meriton
ADDRESS	644-694 George Street, Sydney
LOCATION CHARACTERISTICS	The subject site is an entire block (around 2 hectares) in the in the Sydney CBD bounded by George Street, Liverpool Street, Pitt Street and Goulburn Street.
COMPLETED	2007 (The 680 George Street Tower and World Tower were completed in 2004)
PROPERTY DESCRIPTION	World Square consists of one hotel, one shopping centre, two commercial towers, one residential tower and one commercial/residential tower. World Square comprises office (90,000 sq.m), residential (around 800 apartments), a hotel (420 rooms) and retail (16,000 sq.m).
COMMERCIAL	The 680 George Street Tower is a 55 level office tower with a commercial NLA of 62,250 sq.m Latitude East is a 12 level commercial office building with a commercial NLA of 23,103 sq.m and an average floorplate size of 2,500. World Tower is a 75 level commercial/residential tower with 77 commercial suites
RESIDENTIAL	Hordern Tower is a 55 level residential building with 278 apartments and recreational facilities including a 25m pool, spa, sauna, gym and squash court. World Tower is a 75 level commercial/residential tower with 517 residential apartments and 115 serviced apartments
BUILT FORM	World Tower was designed to a high standard with the architecture similar to the adjacent 680 George Street office tower.
FUNDING MECHANISM	The project was developed in several stages, which allowed separate buildings to be tenanted before construction began. The office and residential components were generally developed separately with Multiplex undertaking the retail/office buildings and Meriton developing the residential. 680 George Street Tower was developed with Ernst & Young pre-committing to around 36,000 sq.m. When construction commenced, the stage had achieved around 60-65% pre-commitment, with the remainder of the building leased towards the end of construction and soon after the building opened. The Australian Tax Office (ATO) pre-committed to the Latitude East building and signed a 15 year lease agreement, plus three five year options. Construction of the building commenced after the pre-commitment.
VIABILITY OF USES	Ernst & Young was secured as a major pre-commitment for the 680 George Street Tower, accounting for almost 60% of the building. The ATO pre-committed to the full Latitude East building to justify development. As the residential and office components were undertaken separately by different developers, the residential components were not used to support the viability of the office components. As such, large pre-commitments of over 55% were required to get the developers off the ground.

OFFICE TENANTS	Initial major tenants comprised Ernst & Young and ATO. Current major office tenants include Brookfield Multiplex, Crown Hotels, Link Market Services, McGraw Hill Education, NAB, Orient Capital, Tabcorp.
MARKET CONDITIONS AT DEVELOPMENT	The Sydney CBD office market reached a low vacancy rate of 4.1% in July 2001. Vacancy rates had remained low at around at around 5% from 1998 to 2002, despite the completion of almost 450,000 sq.m of office space. The Sydney CBD office vacancy rate peaked at 10.5% in January 2005, which coincided with the completion of the Ernst & Young Tower. Economic growth in Australia slowed down from 5% in 1998/99 to 2% in 2000/01. Real gross domestic product remained relatively stable at between 3-4% over the next few years when the project was in the planning phase.
KEY LEARNINGS FOR PARRAMATTA CBD	World Square was a major urban redevelopment of a site that had been dormant for almost 20 years. The development has rejuvenated the southern end of the Sydney CBD with a successful mixed-use development including office, residential, retail and hotel. It is noted that World Square is a large site of around two hectares and was developed in several stages involving residential, office, retail and hotels. There are limited sites in the Parramatta CBD of this size that will make a similar development unlikely in the Parramatta CBD. The office developments required large pre-commitments of over 55% were required to get the developers off the ground. It is considered that Parramatta would require similar pre-commitments to secure development funding.

Project Name **Freshwater Place**	
DEVELOPER	Australand
ADDRESS	Freshwater Place, Southbank
LOCATION CHARACTERISTICS	The subject site is located on the banks of the Yarra River within a few minutes walk to the Melbourne CBD.
COMPLETED	2 Southbank Boulevard – early 2005 Twenty 8 Freshwater Place - December 2008
PROPERTY DESCRIPTION	Freshwater Place is a commercial, residential and retail mixed use development. It has a residential tower and a commercial tower above a retail and commercial use podium.
COMMERCIAL	Freshwater Place has a premium grade commercial tower called 2 Southbank Boulevard providing 55,000 sq.m of commercial space. Freshwater Place has another premium grade commercial tower called Twenty 8 Freshwater Place providing 34,000 sq.m over 25 levels.
RESIDENTIAL	A 60 storey residential tower with around 550 apartment units. The residential tower has three sections: podium, mid rise and high rise.
BUILT FORM	Freshwater Place was built with premium grade finishes and it has superb views of the Yarra River, the CBD skyline and Port Phillip Bay. The residential tower looks relatively commercial in its design with the residents likely to be relatively affluent.
FUNDING MECHANISM	Australand looked to fund the residential and office components separately with pre-sales for the residential apartments and a large office pre-commitment secured for the first stage. Australand pre-signed PricewaterhouseCoopers (PwC) as the anchor tenant for the 2 Southbank Boulevard office e building before construction commenced. PwC initially committed to 23,000 square metres with an option over 8,000 sq.m. The residential development was launched in early 2002 and by October 2002 had sold almost half of the apartments with around 45% of the value of the property had been accounted for in sales. This was considered to be sufficient to justify the commencement of construction. Twenty 8 Freshwater Place was a speculative development with no major tenants pre-committing before construction commenced. To reduce risks, Australand sold a half share to the GPT Wholesale Fund for $115 million in August 2007.
VIABILITY OF USES	The guaranteed pre-commitment of 23,000 sq.m equated to 42% of the office space within 2 Southbank Boulevard. This was considered the minimum pre-commitment required to commence construction. The residential component of the project was not used to 'subsidise' the office component. Residential pre-sales of around 50% were achieved at the start of

	construction (around the minimum required), indicating that residential sales were not used to support the office component.
OFFICE TENANTS	Major office tenants in 2 Southbank include Apple, Kraft Heinz, Microsoft and Vanguard Investments Australia. Major office tenants in Twenty8 Freshwater Place include Adecco Group, CPA Australia and Incitec Pivot. There have not been major issues in attracting major tenants to the building. The residential tower looks relatively commercial in its design and the prestige nature attracted affluent residents.
MARKET CONDITIONS AT DEVELOPMENT	The Southbank office vacancy rate fell to a low of 4.2% in July 2002, when the development was in the planning phase. The adjacent Melbourne CBD market was also relatively tight, having fallen to under 6% in July 2002. The Melbourne apartment market recorded strong a period of lower growth between 1996 and 2001. The residential market started to pick up in 2002 though was still relatively soft as Australand was selling the apartments in 2002. This Economic growth in Australia slowed down from 5% in 1998/99 to 2% in 2000/01. Real gross domestic product remained relatively stable at between 3-4% over the next few years when the project was in the planning phase.
KEY LEARNINGS FOR PARRAMATTA CBD	The development is of a premium quality including both the commercial and residential component. This has resulted in the attraction of major corporate headquarters including Apple, Kraft Heinz, Microsoft and Vanguard. It is unlikely that Parramatta will attract major corporate headquarters in the short term, that Australand was able to attract to the fringe CBD location in Melbourne. It is considered that a similar development (albeit at a smaller scale) could be developed within Parramatta. In the current market, an office building of around 20,000 to 25,000 sq.m represents the most potential based on available tenant pre-commitments of around 10,000 sq.m. However, it is noted that there are limited sites in the Parramatta CBD that have sufficient size to accommodate separate office and residential buildings.

Project Name **Aurora Place**	
DEVELOPER	East Asia Property Group, Lend Lease, Mirvac (only residential)
ADDRESS	155 Macquarie Street, Sydney and 88 Phillip Street, Sydney
LOCATION CHARACTERISTICS	The subject site is located in the core of the Sydney CBD bounded by Phillip Street, Bent Street and Macquarie Street.
COMPLETED	November 2000
PROPERTY DESCRIPTION	Aurora Place is a commercial, residential and retail mixed use development consisting of a 41 level commercial tower, a 18 level residential building and retail facilities around the piazza.
COMMERCIAL	The commercial tower comprises 34 levels of office space with a NLA of approximately 48,000 sq.m on a floorplate of 1,420 sq.m.
RESIDENTIAL	Macquarie Apartments is a 17 level residential tower on a site area of 1,666 sq.m. The development includes 62 apartments including 2 x 2 bedroom, 58 x 3 bedroom and 2 x penthouses. The residential component included larger apartments (97% with more than 2 bedrooms) which is more attractive to owner occupiers compared to investors. In addition, the prestige nature of the apartments meant that buyers are very affluent. This reduces the number of renters and potential impacts on the office tenants.
BUILT FORM	Aurora Place was designed by Italian architect Renzo Piano. The building has an unusual geometric shape where not one panel is parallel to any grid. The residential apartments face away from the office tower with winter gardens that overlook the Botanic Gardens. The high quality of the apartments and separation between the buildings means there is very limited impacts between the uses.
FUNDING MECHANISM	The project involved a consortium of developers including East Asia Property Group, Lend Lease and Mirvac (which was involved in the residential apartments). The consortium model allowed the risk to be shared across three parties and utilised Mirvac's experience for the residential component. ABN Amro was secured as a 14,000 sq.m pre-commitment in early 1998 before construction commenced on the development. This equated to a pre-commitment level of around 30%, which indicates a speculative development. Minter Ellison was secured as an 8,000 sq.m pre-commitment in the second half of 1998 after construction had commenced.
VIABILITY OF USES	The 62 residential units sold out in December 1999, about a year before construction was completed. The penthouses were among the most expensive units ever sold in Australia at the time selling for about $7.5 million and $6.5 million respectively.

	The office component was largely speculative in nature with an initial pre-commitment of only around 30% from ABN Amro. This indicates that the residential apartment sales may have been used to support the viability of the project.
OFFICE TENANTS	Initial anchor tenants included financial services, law and banking companies. including ABN AMRO, Minter Ellison, Challenger International, Statestreet Global Services and the Executive Centre. Current major office tenants include LEK Consulting, Luminus Partners, McKinsey & Company, Port Jackson Partners, Rothschild Australia
MARKET CONDITIONS AT DEVELOPMENT	The Sydney CBD office vacancy rate peaked at 20% in January 1993 before declining to 5% in January 1998, which is when construction on the building commenced. This involved a five year period of virtually no development, while vacant space was absorbed by the market. Between 1996 to 1998, while the project was in the planning phase, the Australian economy was recording strong gross domestic product growth of around 4%. This is above the average over the last 25 years of around 3%. The residential apartment market in Sydney was relatively stagnant between 1994 to 1996 before starting to increase. The strong economic conditions supported the sales of the prestige residential apartments.
KEY LEARNINGS FOR PARRAMATTA CBD	Aurora Place was developed on a relatively large site that allowed for the commercial and residential components to be developed in separate buildings that are connected by a retail piazza. With the Apartments fronting Macquarie Street and the office building fronting Phillip Street, it allowed for the uses to be separated to reduce potential conflicts. The residential apartments were architecturally designed to a very high standard, which fits in with the premium office buildings in the core of the CBD and does not impact on visual amenity. The apartments are among the most prestigious in Sydney and it is unlikely apartments of this quality would be attractive in the Parramatta CBD environment. It is considered that a similar development (albeit at a smaller scale for the office component) could be developed within Parramatta. In the current market, an office building of around 20,000 to 25,000 sq.m represents the most potential based on available tenant pre-commitments of around 10,000 sq.m. However, it is noted that there are limited sites in the Parramatta CBD that have sufficient size to accommodate separate office and residential buildings.

8.2. IMPLICATIONS FOR PARRAMATTA

The implications for the Parramatta CBD of the mixed-use case studies include:

- **Vertical Mixed Use:** There are limited examples in Australia of vertical mixed use developments that include A-Grade/Premium office space with residential apartments above. These projects are rare due to some of the potential conflicts between commercial and residential uses in the same building. The Riparian Plaza is the most successful example of such a development though it was supported by a major capital city location, iconic architect, prestige quality and representing the first premium office development in Brisbane in a decade.

  It is noted that a strong residential market (such as during the boom of 2011-2016) has the potential to increase the attractiveness of such developments in the Parramatta CBD with the ability of residential development to underpin or cross-subsidise the viability of office development. However, this is unlikely to produce high quality office space to attract A-Grade tenants

- **Horizontal Mixed Use:** There is potential for horizontal mixed use development in the Parramatta CBD that includes multiple buildings with a dedicated office and residential building. This would reduce the potential conflicts between uses though it is noted there are limited sites with the large size needed to accommodate separate A-Grade office and residential buildings

- **Development Viability:** The viability of mixed-use developments has generally required both the residential and office components to have sufficient pre-sales/pre-commitments before construction commenced. Some developments occurring prior to the Global Financial Crisis were more speculative in nature. Under the current market in Parramatta, it is unlikely that A-Grade office space will be built speculatively unless there are both office precommitments and residential presales. Residential apartment sales could potentially underpin the development of the office component if the residential market was to return to a boom cycle

- **Residential Quality:** The residential apartments developed in these projects are generally of a very high quality to reduce potential impacts with adjacent office space

- **Large Sites:** A large-scale mixed development such as World Square is unlikely to be undertaken in the Parramatta CBD unless a suitably large contiguous development site can be provided. The Parramatta Square development represents the site with the most potential to be similar to the World Square development

- **Train Station:** The Forum in St Leonards is built directly over St Leonards train station and represents a transport orientated development. There is significant airspace around the Parramatta Train Station with potential to investigate opportunities for development above the station. The Interchange at Chatswood is another example of mixed use development around a train station (albeit with limited office space).

9. CONSTRAINTS AND OPPORTUNITIES

9.1. CONSTRAINTS ANALYSIS

This section assesses the constraints to A-Grade office development within the Parramatta CBD. The section identifies and assesses various site, market and planning characteristics that reduce the viability of potential for A-Grade development. Addressing these issues has the potential to facilitate development.

9.1.1. Parcel Size

It is noted that lot sizes within the Commercial Core are generally over 1,000 sq.m with some smaller lots located on Macquarie Street and Phillip Street to the west of Smith Street. Some older office buildings within the C and D-Grade categories are situated on smaller sites and therefore have smaller floorplates. If the overall quality of accommodation is to renew and improve over time, site amalgamations would be required to result in buildings with larger floorplates and improved amenity by way of outlook and natural light access achieved by ensuring sufficient separation between taller towers.

Large office tenants in the current property market generally want buildings with a minimum floorplate of 1,500 sq.m. This reduces the number of floors that the company requires and allows for improved connectivity and interaction between staff.

The City of Parramatta Urban Design team were tasked with testing the impact of unlimited commercial floor space within the Commercial Core of Parramatta. Council selected five sites ranging from 2,000-9,700sq.m under single ownership and not affected by the Civic Link. Based on the testing it is apparent that minimum site areas are needed to achieve office floorplates of at least 1,500 sq.m due to required tower separation of 18m and street frontage setbacks of 6m.

The key findings of the analysis were:

- Sites under 2,500sq.m have difficulty achieving commercial floor plates of 1,500sq.m. Having unlimited floor space also results in unrealistic forms or compromises tower separations for sites of this size
- Sites between 2,500-3,300 sq.m can generate floorplates of 1,500-1,800sq.m subject to site orientation, street frontage and ability to achieve inter-building separation and street frontage setbacks
- Sites above 3,300sq.m can accommodate floor plates of 1,800sq.m or more subject to site orientation, street frontage and ability to achieve inter-building separation and street frontage setbacks.

Urban Design Testing

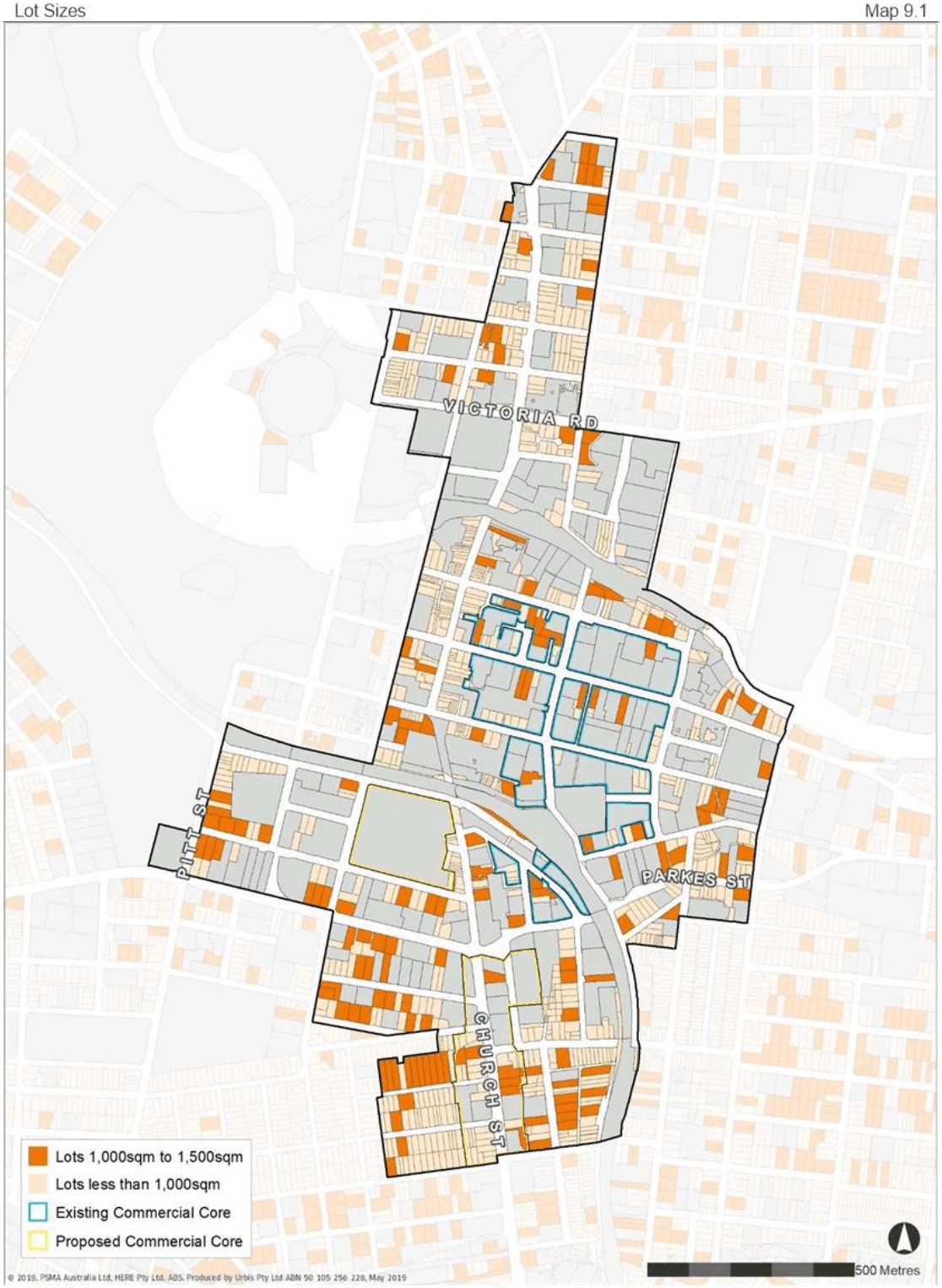
SELECTED SITES TABLE 9.1

Type	Tower Floor plate	Min Site Area	Max FSR till AHD 243
Corner site	1,800sqm	3,315 sq.m	26.4:1
Single Frontage	1,800sqm	3,510 sq.m	24.8:1
Corner site	1,500sqm	2,925 sq.m	25.1:1
Single Frontage	1,500sqm	3,120 sq.m	23.3:1

Source: City of Parramatta

To allow for the development of a separate A-Grade office building of 1,500 sq.m and a residential apartment building, it is anticipated that a site of at least 5,000 sq.m would be required. It is noted that there are limited sites of this size with development potential in the Parramatta CBD. Some of these sites include two school sites and Westfield Parramatta, which are very unlikely to include residential apartments in any future redevelopment.

Lot Sizes Map 9.1



Site amalgamation for redevelopment will be difficult to justify on the grounds of economic viability unless the cost of the acquisition and potential demolition does not significantly exceed the underlying land value for new development.

As such, there is scope for Council to continue with planning incentives that will assist in site amalgamations over time provided they result in new development that improves the overall quality of stock in the Parramatta CBD over time (i.e. improving the quality of office accommodation by grade, which includes larger floorplates and improved access to natural light).

FSR bonuses for larger lots could promote amalgamation by improving the financial viability of redevelopment projects. This may be in the form of allowing higher FSRs on larger sites. The Gateway Determination condition outlines a requirement that sites must have a site area over 1,800 sq.m to achieve unlimited office space in the B3 Commercial Core (condition (i) (v)). This position was adopted by Council at the meeting on 25 March 2019 and subsequently reaffirmed at the meeting of 22 July 2019.

We note however that Council's ability to promote and/or influence site amalgamation is limited, and ultimately the market will have the greatest influence on redevelopment occurring, albeit with the support of Council.

9.1.2. Proximity to Train Stations

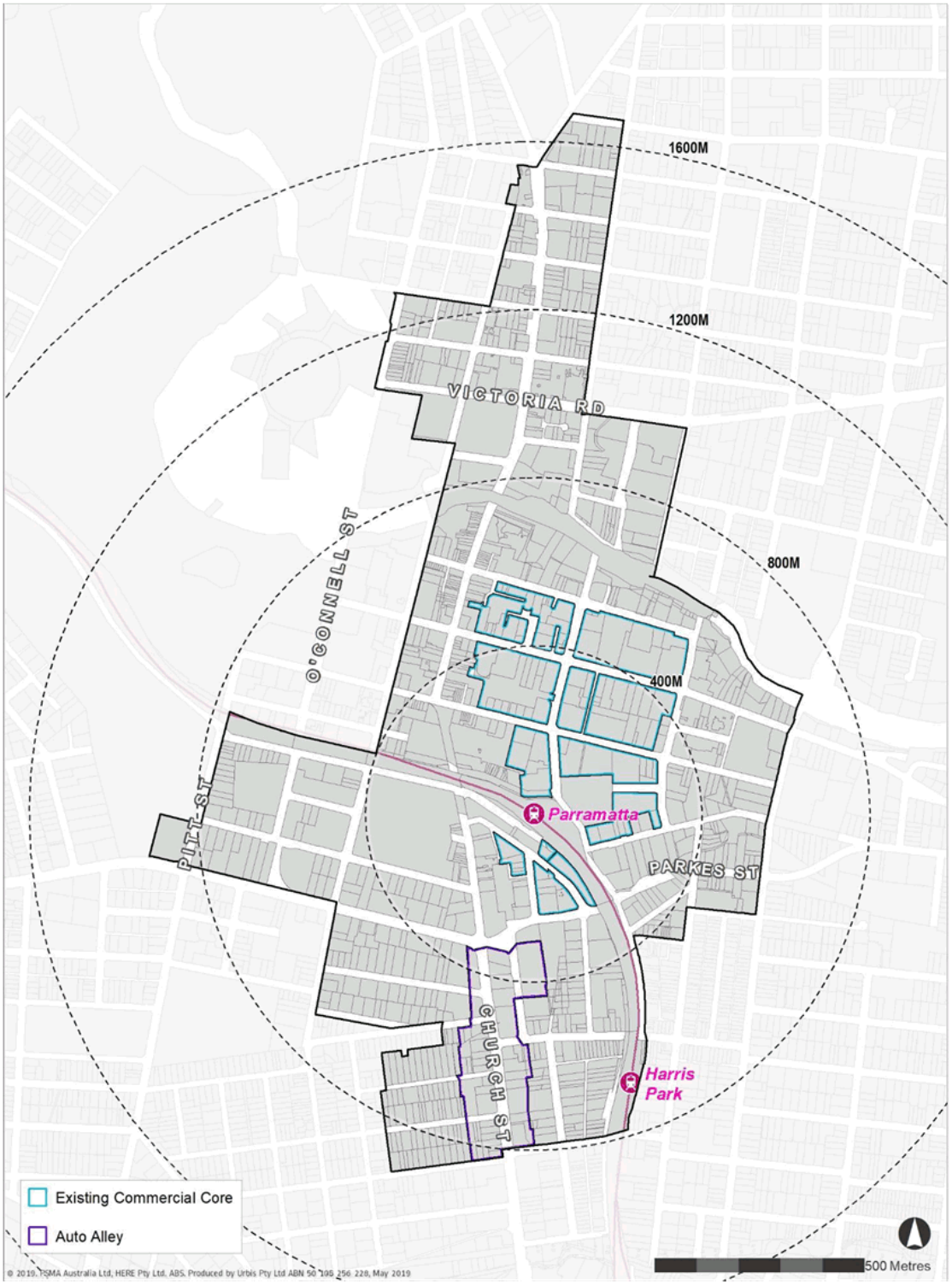
The following map highlights the distance of commercial precincts from the Parramatta Train Station, which is a key infrastructure driver of the Parramatta CBD. The Parramatta River is generally located approximately 700-800 metres north of the Parramatta Train Station, with areas to the north of the river starting to be a bit removed from the core area.

The Auto Alley corridor is around 500 metres long with the start of the precinct located around a 450 metre walk to the Parramatta Train Station. It is further removed from the primary commercial area, which is located around 200-300metres to the north of the train line. It is noted that Auto Alley is around a 400 metre walk from the Harris Park Train Station, though it is currently a smaller train station that does not attract the same level of train services as Parramatta Train Station.

In addition, it is noted that Church Street/ Great Western Highway is a major six lane road that bisects Auto Alley. This is likely to reduce the walkability of the precinct and reduce the amenity of the area and have a negative impact on the potential development of A-Grade office space.

As a result, Auto Alley is considered to be a longer term prospect due to the distance from the Parramatta Train Station and existing commercial core and the lower quality amenity offered by the nature of traffic on Church Street (Great Western Highway). It is considered that the commercial development in the short-medium term is more likely to be B-Grade or lower quality A-Grade product.

Distance from Train Station Map 9.2


1600M
1200M
800M
400M
VICTORIA RD
O'CONNELL ST
PITT ST
PARKES ST
CHURCH ST
Parramatta
Harris Park
Existing Commercial Core
Auto Alley
500 Metres
© 2019. TSMA Australia Ltd, HERE Pty Ltd, ABS. Produced by Urbis Pty Ltd ABN 50 105 256 228, May 2019

9.1.3. Residential Design

The following images are of residential apartments that have been developed within the Parramatta City Centre, adjacent to the Commercial Core. It is noted that some of the design of residential development around the Commercial Core is focused on a more traditional residential design aesthetic and would not be considered to have 'commercial or androgynous design characteristics' that would blend well with higher calibre A-Grade office design typology.

Figure 1 – Residential Apartments in Parramatta City Centre

Picture 1 – Corner of Fitzwilliam and Church St

Picture 2 – corner of Parkes and Cowper St

This is in comparison to case study developments such as Lumiere and Aurora Place in the Sudney CBD and the V by Crown at Parramatta (see the images below), which have higher quality design with more of a commercial aesthetic. These higher quality developments can be described as more 'androgynous' buildings as it is not always immediately obvious if they are residential or commercial buildings.

Based on interviews and discussions with large office tenants and institutional investors in the broader Sydney market including markets such as Sydney CBD, Chatswood and North Sydney CBD, it was noted that large tenants will not pre-commit to a commercial area if it does not meet environmental and amenity requirements. Large tenants are not concerned with being located next to residential buildings as long as the residential development is of a relatively high quality and therefore will not negatively impact on their image.

Figure 2 – Residential Apartments in Sydney City

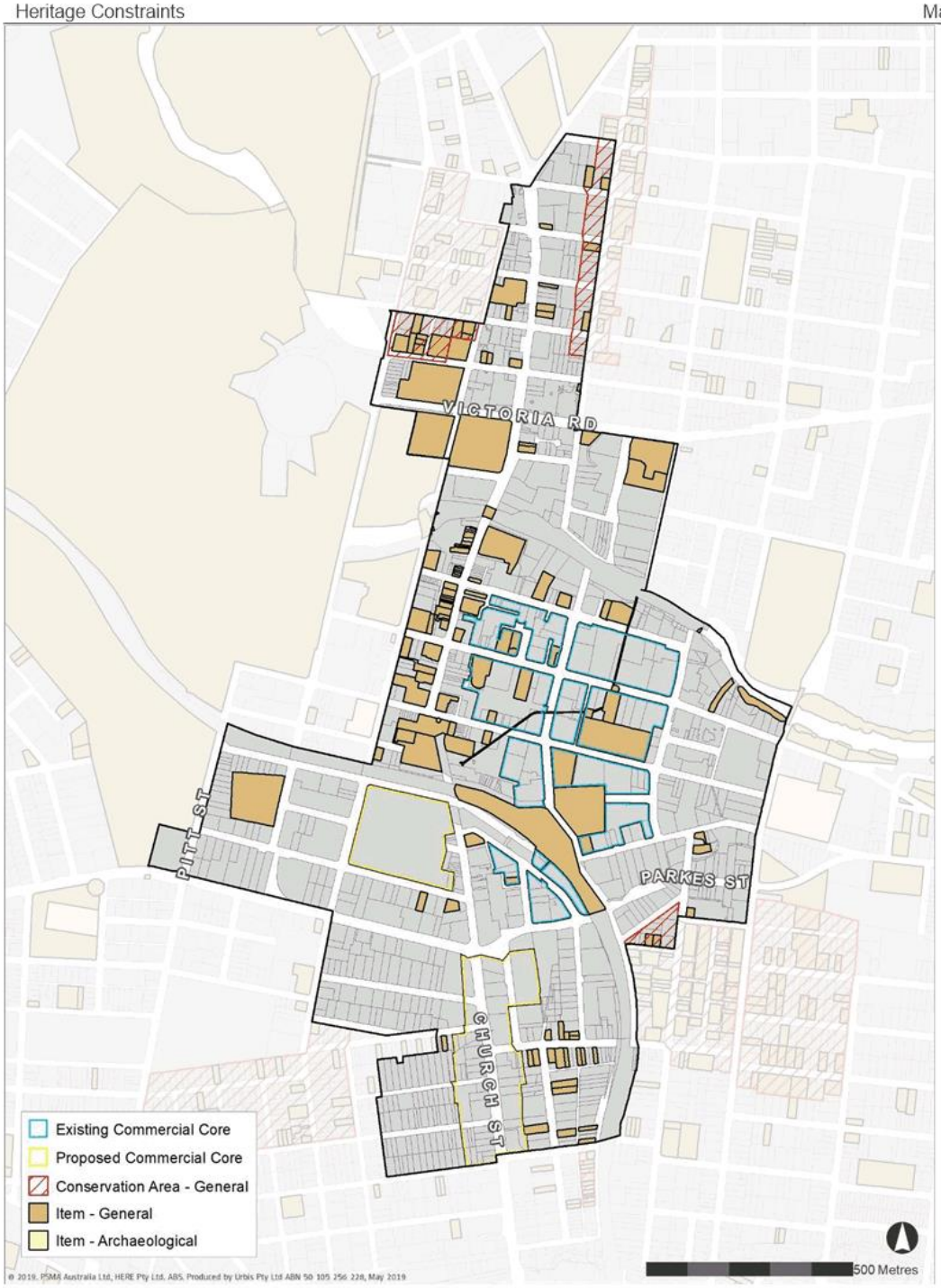
Picture 3 – Lumiere (Sydney CBD)

Picture 4 – V by Crown (Parramatta CBD)

9.1.4. Heritage

The following map highlights the heritage constraints within the Parramatta City Centre. Heritage buildings and issues can have a significant constraint on the potential to develop A-Grade buildings. This is due to the location of heritage items impacting the capability to provide large floorplate office buildings of over 1,500 sq.m on certain lots. There are several heritage items located from the Parramatta Train Station and along Church Street.

Heritage Constraints Map 9.3

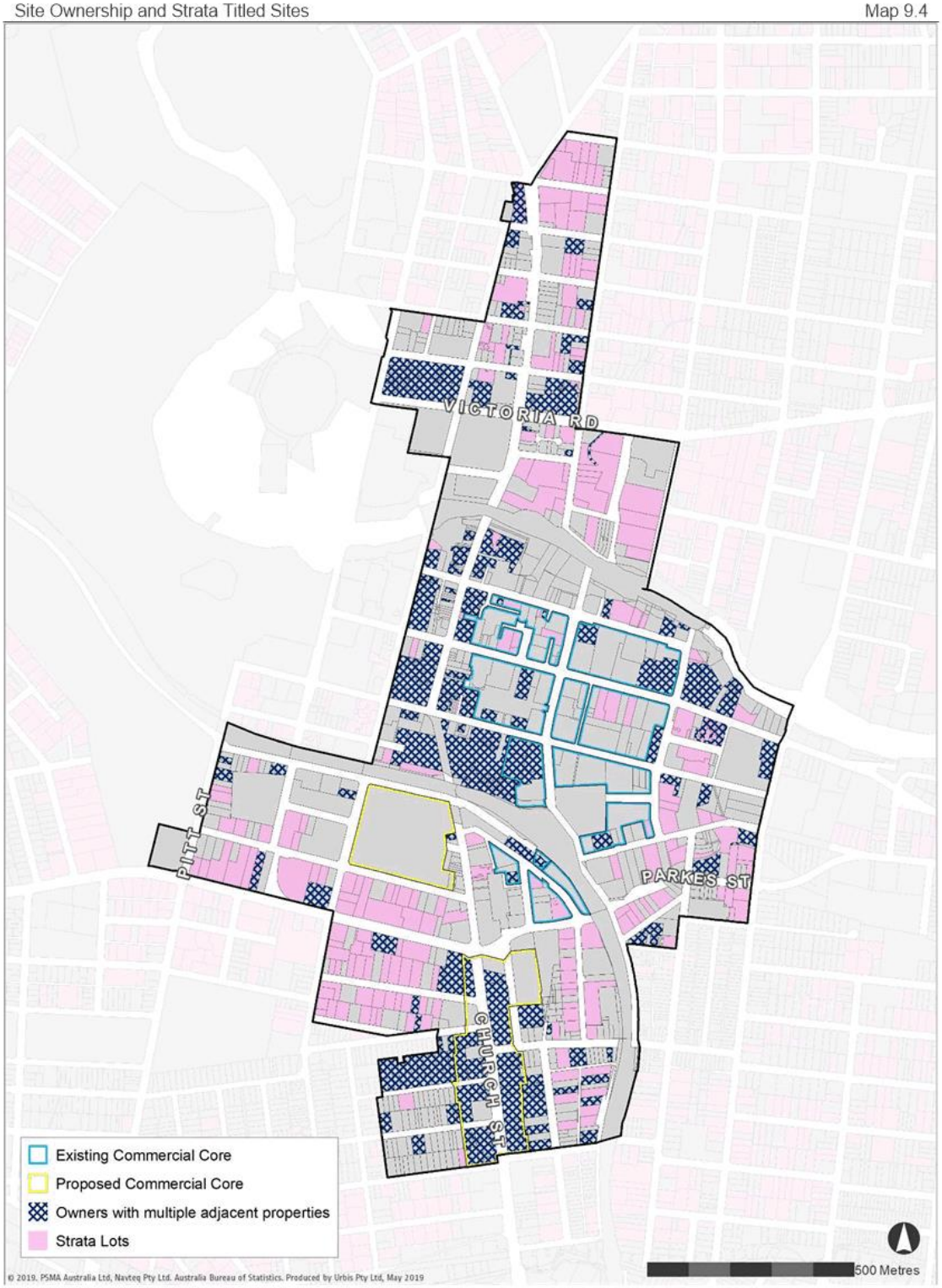


9.1.5. Fragmented Ownership and Strata Titling

The following map highlights sites within the Parramatta Commercial Core that are strata titled as well as adjacent lots under common ownership. Amalgamating smaller lots to create larger sites capable of accommodating a large floorplate office building can be challenging, especially when dealing with multiple owners in a strata scheme. The map highlights that there are a few adjacent lots with common ownership, however these are located outside the existing Commercial Core.

The development of office buildings that are held under one ownership can allow for the renewal and redevelopment over time. The cycle can take 30-40 years though (i.e. the economic life of a commercial office building without major upgrade) and allows for older and generally smaller buildings to be redeveloped in the future.

Site Ownership and Strata Titled Sites Map 9.4



It is noted that the strata-titling of buildings such as residential apartments and smaller office can create issues with redevelopment due to the multiple owners involved and the difficulty in obtaining consensus to sell in one line and/or redevelop. This effectively 'locks' the site from future redevelopment and therefore

needs to be a consideration in planning for new development. Ideally a site should be meeting or exceeding development controls before strata subdivision should be considered.

Residential apartments held in 'one line' and rented out would reduce the impacts of strata-titling locking away sites. More developers are looking at Build-to-Rent though there are obstacles such as taxation and returns than are limiting activity in the current market. Meriton is one of the only developers that currently holds apartments for rental (though it is able to do this due to a lower reliance on debt financing) though developers such as Mirvac are currently also undertaking projects.

Tt is noted that most large residential developments in Australia continues to be strata titled as this represents the highest return on investment. The rental yield for residential apartments in Sydney is generally under 4%, which is well below other property asset classes such as retail, office and industrial. As such, the rental return is not high enough to justify holding apartments unless potential capital growth is considered. In addition, most developers need to sell the majority of apartments off-the-plan to reduce risk and meet financing conditions even if they think the apartments will achieve significant capital growth.

9.1.6. FSR Capacity

City of Parramatta has undertaken a preliminary assessment of the capacity for additional development within the Parramatta City Centre. The assessment excludes land that is not considered developable such as:

- Land identified as open space (i.e. zoned RE1 Public Recreation, RE2 Private Recreation) under the current LEPs
- Land identified as containing heritage items
- Land identified as major community or education facilities
- Land identified as having recent large-scale development (e.g. Eclipse Tower, Sydney Water building, Meriton Altitude and PSQ1); or large-scale development currently under construction (e.g. PSQ3 and PSQ4)
- Land identified as having strata subdivision with more than 10 lots
- Land identified as roads or railways (e.g. zoned SP2 Infrastructure) under the relevant LEP.

Table 9.1 compares the required floorspace to meet employment and dwelling targets established within the Parramatta CBD Planning Strategy (2015) with the capacity for development under different planning scenarios. Based on a projected target of 27,000 additional jobs and 7,500 additional dwellings by 2036, City of Parramatta has estimated there is a need for almost 2.1 million sq.m of commercial and residential floorspace.

Under the existing planning controls, City of Parramatta has identified that there is insufficient capacity to meet targets with a deficit for residential floorspace.

Under proposed planning controls (including increased FSRs outlined in Map 1.4), there is considered to be sufficient capacity to meet the targets, with a surplus of more than double the existing target.

Proposed Floorspace - 2016-2036

PARRAMATTA CITY CENTRE TABLE 9.2

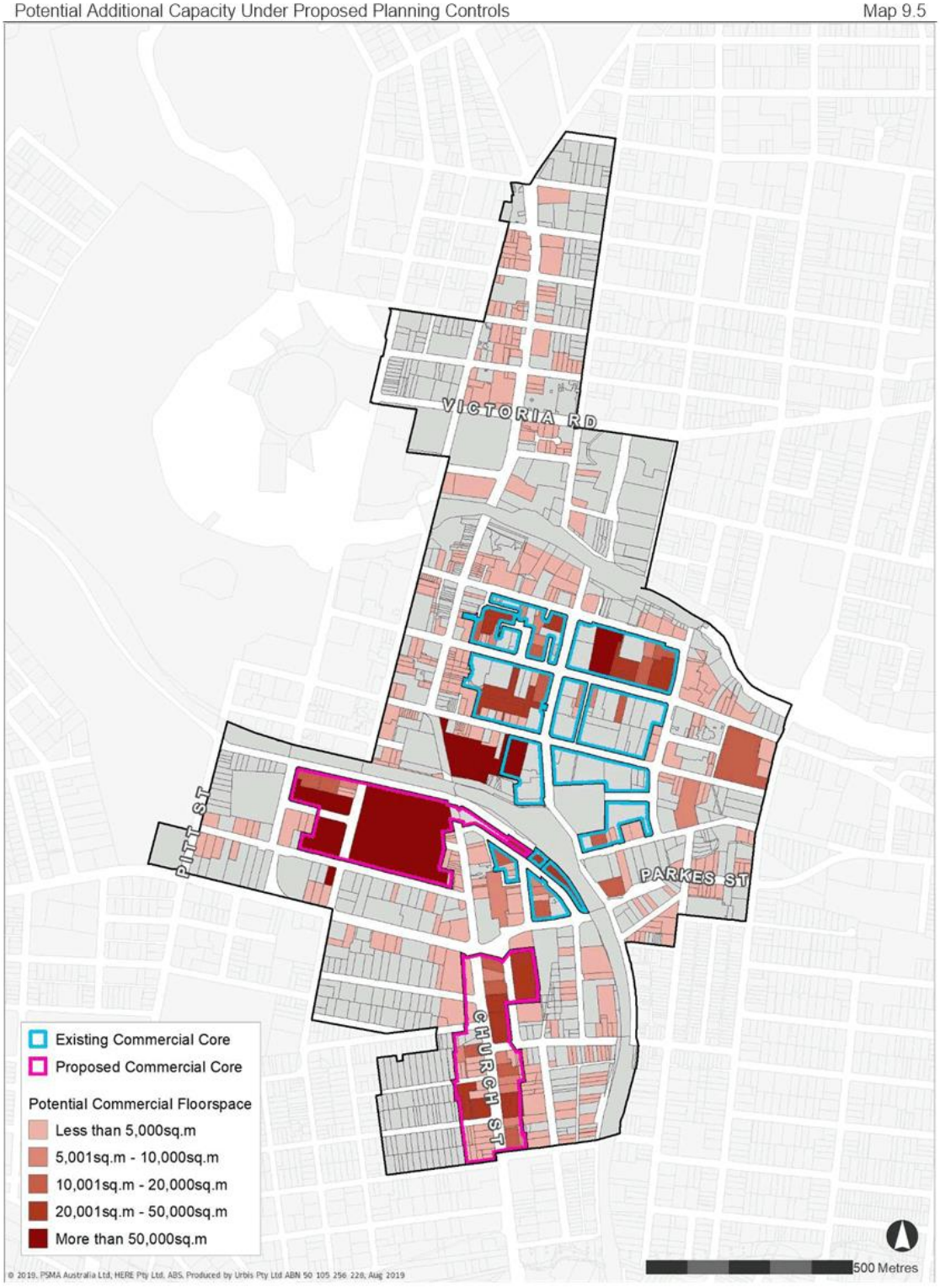
Scenario	Floorspace (Sq.m)	Surplus (-Deficit)
Parramatta CBD Planning Strategy (2015)		
Commercial	972,000	
Residential	1,125,000	
Total	**2,097,000**	
Existing Controls		
Commercial	987,211	15,211
Residential	709,941	-415,059
Total	**1,697,152**	**-399,848**
CBD Planning Proposal Controls (No residential in B3 Commercial Core)		
Commercial	1,881,762	909,762
Residential	2,624,297	1,499,297
Total	**4,506,059**	**2,409,059**

Source: City of Parramatta, Urbis

Parramatta Council has assumed the built FSR within the current and proposed Commercial Core zone. Map 9.6 compares the estimated built FSR within the current and proposed Commercial Core zone with the capacity for development under proposed planning controls. The analysis identifies the following sites as having the most development potential in the Commercial Core:

- 105 Phillip Street and 110-130 George Street
- Parramall (55-67 George Street)
- 41-45 George Street
- Erby Place Car Park (30 George Street)
- Horwood Place Car Park (71 George Street)
- Westfield Parramatta
- Justice Precinct (which is outside the current Planning Proposal area)
- Parramatta Square.

Potential Additional Capacity Under Proposed Planning Controls Map 9.5



9.1.7. Development Costs

The financial realities of A-Grade office development have previously been a constraint to development in the Parramatta CBD. Net face rents for A-Grade office space in the Parramatta CBD have increased significantly in recent years and are now generally between $635-$700 per sq.m/pa. Parramatta CBD rents are now around 40-50% higher than rents in North Ryde/ Macquarie Park (they were only 30-40% higher in 2015).

At the same time, the cost of developing high-rise office buildings in CBD locations is considerably higher than lower density campus style office buildings on larger sites. Based on data from Rawlinsons Construction Handbook 2019 - Edition 37, the cost of developing a 4-7 storey office building in Sydney is between $2,495-$2,690 per sq.m while office buildings of 7-20 storeys are between $3,550-$3,830 per sq.m. The higher costs are generally a result of increased costs for vertical transport and structural requirements.

This indicates that construction costs in Macquarie Park are likely to be at least 40% lower than in the Parramatta CBD. This flows onto the required rental levels that would be required to achieve a minimum return on investment. This dynamic of higher construction costs means that developers need to achieve pre-commitments at rental levels well above campus locations such as North Ryde/ Macquarie Park, which is one of the reasons that Parramatta has previously struggled to attract new office development with private sector pre-commitments.

As outlined earlier, rents in Parramatta have increased significantly in the last few years, which has benefited the overall viability of office development in the Parramatta CBD and has been reflected with new projects under construction.

9.2. PLANNING OPTIONS TO INFLUENCE OFFICE SUPPLY

This section assesses the potential options available to Council to utilise planning controls and residential development to facilitate viable A-Grade office development within the Parramatta CBD. The options look to address the constraints to office development that are outlined in the preceding section.

9.2.1. Minimum Office FSR

The 2015 CBD Planning Strategy outlines the potential for residential uses to be permitted in the Commercial Core subject to the following conditions being met:

- A significant quantum of office space (i.e. 20,000 sq.m minimum) is built before residential occupation of a development site. Most A-Grade office buildings developed in Sydney are at least 20,000 sq.m, which effectively means the control requires A-Grade office space to be developed before residential is allowed
- Sites deliver primarily employment uses (i.e. employment uses comprise a minimum 50% of total floorspace). This control ensures employment uses remain the primary use in the Commercial Core and prevents residential dominant mixed-use developments on large sites
- Non-residential FSR exceeding the minimum requirements above should be exempt from the overall maximum FSR in the Commercial Core. This provides a bonus to developers by allowing them to develop additional office space. This may include allowing developers to achieve a FSR of 12:1 on a site as along as an office FSR of 6:1 is achieved on the site.

On sites which already have considerable office space such as parts of the existing Commercial Core in George Street and Phillip Street to the east of Smith Street, this would require net additional A-Grade space of at least 20,000 sq.m. So a site that currently has an ageing 20,000 sq.m office building, would need to build at least 40,000 sq.m of office space to allow for the replacement of the old building plus 20,000 sq.m of additional office before residential could be developed. It is noted that developers are unlikely to build office buildings of over 25,000 sq.m in the Parramatta CBD unless they can secure a very large pre-commitment such as a major bank or multiple government tenants.

9.2.2. Transferable Development Rights

Transferable development rights allow a developer to transfer development rights from one site onto another. It the context of the Parramatta CBD, this could allow a developer to build a A-Grade office building in the Commercial Core and transfer any residential development rights to other parts of the Parramatta CBD. This would allow developers to focus on commercial development within the Commercial Core, while still allowing them the benefit of residential development rights to improve the viability of development. This has the

potential of improving the financial viability of A-Grade office development in the Commercial Core when the residential market is strong whilst maintaining the predominantly commercial focus.

It is noted that the only example of transferable development rights in NSW is for heritage buildings in the Sydney CBD. As such, implementing this policy would likely have broader policy implications and require significant input from the Department of Planning, Industry and Environment in the development of this policy.

It is also noted the City of Sydney experienced some administrative issues with the establishment and operation of the transferable rights system. There were cases where the demand for rights did not exactly match the supply, with fractions of heritage floor space left over. As such, Parramatta Council would need to investigate this option in some more depth and establish a simple process to grant and then distribute floorspace transfers.

9.2.3. Residential Development Cap

A residential development cap would allow a maximum amount of residential floorspace to be developed within the Commercial Core to a stated point in time. This could operate in conjunction with minimum provision requirements of commercial floor space within a mixed-use development (e.g. a 50% minimum commercial floor space provision on the development site).

A residential cap would have the benefit of allowing residential development in the Commercial Core to help facilitate the development of A-Grade office space when the residential market is strong. At the same time, the cap would limit the total amount of residential space that could be developed and ensure that employment uses remain the primary use in the Commercial Core. This would avoid problems such as what occurred in the Chatswood CBD with significant residential development changing the perception of the centre or ends up displacing opportunities for employment generating development, as has been the case in parts of the Sydney CBD.

The implementation of an initial cap if office development viability deteriorates may have the added benefit of facilitating development of A-Grade office space for a period of time as developers look to take advantage of the opportunity before it is exhausted. Council also has the option to review the cap at certain development thresholds to determine if it is appropriate to extend.

9.2.4. Residential Design Code

To ensure that residential development does not have a detrimental impact on the office market in the Commercial Core, a residential design code could be implemented to maintain high design standards. Potential minimum requirements could include:

- No exposed concrete
- Limited exposed balconies (use of wintergardens where possible)
- Tinted glass and other commercial grade facade treatments.

10. CONCLUSIONS AND RECOMMENDATIONS

This section summarises the key findings of the assessment and outlines viable strategies to attract A-Grade office development to the Parramatta CBD.

10.1. SUMMARY OF KEY ISSUES

The following issues are considered to be most relevant to the attraction of A-Grade office space to the Parramatta CBD:

- The NSW Government has identified the growth of Parramatta as Sydney's second CBD as a key priority. The Parramatta CBD Planning Strategy identifies a target of 27,000 additional jobs and 7,500 additional dwellings by 2036. To achieve this employment target, City of Parramatta has a planning capacity target of around 970,000 sq.m of commercial floorspace by 2036

- The Parramatta CBD has over 324,600 sq.m of A-Grade office space with a very low vacancy rate of under 1%. Despite the low vacancy rates over the last decade, the CBD has been able to attract only limited new development (four developments over 20,000 sq.m in the last 10 years) and the required large tenant pre-commitments. There has been significant competitive pressure from centres such as Macquarie Park and Norwest, which have been more successful at attracting large tenants due to being able to develop new purpose built offices, with large floorplates and lower rents. Large tenants have been expressing increased interest in the Parramatta CBD, which has translated to higher rents in the last three years. While the financial fundamentals have constrained development historically, they have improved in recent years which is translating to more development activity

- Residential development is important in adding to the vibrancy of commercial centres. Most major CBDs in Australia support residential apartments and are not considered to have a detrimental impact on the viability of office development, provided the quality of residential development is consistent with the quality of office development and the commercial predominance of the centre is maintained

- Mixed use developments can be successfully developed in CBDs without negatively impacting the A-Grade office market. Large mixed use projects including a mix of office, residential, retail and other uses can act as catalysts for investment in precincts by increasing activity and improving the image of an area. Successful developments have a higher quality design that reduces the negative impacts and potential conflicts between office and residential uses. This includes the inclusion of 'commercial aesthetic characteristics' as part of the design of residential buildings

- There are several land constraints to potential development of A-Grade office space in the Parramatta CBD including lot sizes, heritage buildings, fragmented ownership and strata titling

- In order to achieve the employment and residential dwelling targets of the Parramatta CBD Planning Strategy and *A Plan for Growing Sydney*, the planning controls within the Parramatta City Centre need to be designed to increase the capacity and viability of future development. Under proposed controls in the Parramatta CBD Planning Strategy, there is estimated to be capacity for 4.5 million sq.m of additional floorspace in the Parramatta CBD

- There are several sites within the Parramatta CBD with development potential for A-Grade office space. These sites generally have relatively low density development and are of sufficient size to accommodate a building floorplate of over 1,500 sq.m, which is generally desired by prospective A-Grade tenants. Urban design testing by Council indicates that site areas of at least 2,500 are required in order to be able to achieve 1,500 sq.m floorplates. The Gateway Determination condition to the CBD Planning Proposal requires a minimum 1,800 sqm of site area before unlimited office space would be allowed in the B3 Commercial Core (condition (i) (v)). This position was adopted by Council at the meeting on 25 March 2019 and subsequently reaffirmed at the meeting of 22 July 2019.

- While the residential market has softened and the office market has picked up in the last 2-3 years, allowing residential in the Commercial Core has the potential to facilitate viable development of A-Grade office space in the Parramatta CBD if relative viabilities were to reverse. This could include the more profitable residential component subsidising the office component and boosting the overall viability of the

development. However, constraints to the effectiveness of mixed use development to facilitate A-Grade office development include:

- Vertical mixed-use developments have the potential to be developed with residential apartments generally being developed above the office component to assist in subsidising the office component. It is unlikely that such a development would generate quality A-Grade office space, which has the potential to generate lower quality space given the difficultly of designing an efficient building with multiple lift cores and the overall perception that potential office tenants would have in such a building

- Horizontal mixed-use developments are likely to need development sites of at least 5,000 sq.m to allow for separation between the office and residential buildings. There are limited sites of such a size in the Commercial Core with development potential, which can viably accommodate a net increase of at least 20,000 sq.m of office space and a residential building.

10.2. RECOMMENDATIONS

The following tables outline the recommendations for attracting A-Grade office space to the Parramatta CBD. This includes:

- Table 10.1 outlines the requirements for A-Grade office space that will make new buildings attractive to large tenants. These large corporate tenants are needed to pre-commit to new buildings to make the developments financially viable. The recommended requirements are based on discussions and interviews with office leasing agents and large tenants in 2015 within the broader Sydney market as well as classifications within the Property Council of Australia's *A Guide to Office Building Quality 2012*. Based on Urbis's work in the office leasing market, market requirements have not changed significantly since 2015

- Table 10.2 outlines planning recommendations to be considered by City of Parramatta to attract A-Grade office space including the justification for the recommendation and how it will address key issues and requirements in the market.

A-Grade Office Requirements

PARRAMATTA CBD TABLE 10.1

Recommendation	Description	Justification
Large floorplates	New A-Grade office space generally needs to have a floorplate size of at least 1,300 sq.m, with most major tenants wanting a floorplate of over 1,500 sq.m. (It is also noted that in some instances tenants are looking for office accommodation with floorplates over 2,000 sq.m, which is more common in locations such as Macquarie Park and in new major development in the Sydney CBD such as Barangaroo).	• Large corporations want to improve the circulation and interaction within their offices. Large floorplates allow businesses to get more workers on the same floor and improve social interaction in the office. Tall and thin towers fail to provide this requirement to tenants • The ability to provide very large floorplate campus style offices is one of the reasons corporate business parks have successfully attracted large corporate offices (combined with relatively affordable rents).
Flexible and accessible floorplates	Large open floorplates that allow for flexible and efficient workspace design and internal circulation. This includes internal stairways to connect adjacent floors and limited internal columns. This also includes preferences to reduce large central cores (with lifts and fire stairs), with a growing preference for side cores.	• Similar to the benefits of large floorplates, tenants want the space to be flexible to allow for the maximisation of circulation and to encourage interaction and collaboration. More companies are moving towards agile work and open planned environments with less private offices • Some traditional offices have a large internal core (with fire stairs and lifts) that fragments the office. Flexible design, such as the use of side cores, can reduce this impact and provide more open workspaces.
High ceiling heights	High ceilings of 2.7 metres and above.	• High ceilings provide a more 'open' workspace that is attractive to workers and tenants. As such, height controls should be flexible for commercial office buildings in order not to stifle optimum floor to ceiling heights.
Good lift service	High quality and high frequency of lifts in the building.	• Tenants require high quality and high frequency lifts to support the circulation of staff • Slow and unreliable lifts can provide a poor impression on the building and tenants.
On site facilities	Provision of end-of-trip facilities within the building such as bike storage, showers, change rooms and lockers to support people taking active transport to work.	• A larger proportion of workers are taking active forms of transport to work such as cycling, jogging and walking. On-site facilities improve the amenity and make it easier for building tenants to attract and retain staff.

Recommendation	Description	Justification
Amenity	Access to local amenities including retail, dining options, public space, recreation facilities and other personal services. A corporate setting within a vibrant commercial centre that includes other successful businesses.	• Major corporations want to be located in an area with amenities that is attractive to their staff including access to retail, food, recreation and other services • Tenants want to be located in a location that matches their corporate image and do not want to be surrounded by poor quality buildings and apartments with 'washing on display'. Adjoining buildings whether they be commercial or residential need to be of a similar high standard and well managed.
Environmental	4 Star Green Star Design Rating including 4.5 Star NABERS Office Energy rating commitment.	• The Property Council of Australia's *A Guide to Office Building Quality 2012* classifies A-Grade office space as at least meeting these environmental standards. Most large corporations are conscious of their environmental footprint and look to move into more energy efficient buildings where possible.

Recommendations

PARRAMATTA CBD TABLE 10.2

Recommendation	Description	Justification
Office as predominant use in Commercial Core.	Reaffirm office development as the predominant use in the Commercial Core though allow residential apartment development by exception under certain circumstances (see recommendations below). It is recommended that controls promote A-Grade office buildings of at least 20,000 sq.m and be informed by planning, design and heritage considerations. Buildings less than 20,000 sq.m should not be prohibited as some sites may have constraints that limit achievable size.	• Most successful CBDs successfully integrate commercial office development with residential apartments to create a vibrant commercial district. While it is important that the Parramatta CBD support a Commercial Core that is predominantly office uses, there is considered to be a place for residential as part of horizontal mixed use developments. Allowing residential development also has the benefit of helping to facilitate viable office development during market cycles where residential can provide a higher relative return. • The last four A-Grade office buildings developed in the Parramatta CBD have all been over 20,000 sq.m with a floorplate of over 1,300 sq.m. It is considered that large A-Grade office buildings of over 20,000 sq.m need to be promoted for the Parramatta CBD to transition into a major CBD of metropolitan significance • This may be integrated with the minimum office FSR that allows alternative complementary mixed-use development if a significant minimum A-Grade office component is provided.
Subject to planning, design, and heritage considerations, potentially allow horizontal mixed use development in the Commercial Core subject to net additional A-Grade office space of over 20,000 sq.m on the site. Recommended to be considered only if the	Allow a separate residential apartment building to be built on a site where there is the net additional development of A-Grade office space of over 20,000 sq.m. It is recommended that the potential of the strategy be informed by planning, design and heritage considerations to determine the number of sites that can accommodate such development. Note: See Glossary for definitions of vertical and horizontal mixed-use development.	• It is recommended that the potential mixed-use developments be limited to larger sites that have the capacity to maintain a minimum unconstrained A Grade office floor plate of 1,500 sq.m. This is important in maintaining the quality of new A-Grade accommodation in the Parramatta CBD into the future • Council to consider planning, design and heritage factors to determine the number of sites capable of accommodating a horizontal mixed-use development of this nature, particularly where separate residential and office towers can be constructed on one site • While there are only a few sites of a size and nature that can viably accommodate a horizontal mixed-use development with separate office and residential buildings, they represent an opportunity to facilitate development during market cycles where residential is more viable than office development. Applying this recommendation is not considered necessary at present given the current strength of the commercial office market. However, should the commercial office market soften in the future, Council

Recommendation	Description	Justification
relative viability of office development deteriorates.		could consider implementing this recommendation through individual site-specific planning proposals that could accommodate horizontal mixed-use development.
Subject to an adequate number of suitable sites being identified in the Commercial Core for horizontal mixed-use development, consider implementing a residential development cap. Recommended to be considered only if the relative viability of office development deteriorates.	Implementing a cap on the amount of residential floorspace that can be developed in the Commercial Core (subject to adequate sites in the Commercial Core being identified for horizontal mixed-use development).	• The residential market in Parramatta has softened in the last two years from the boom during 2013 to 2017 with office development becoming more viable compared to residential apartments. If the relative viability was to return to previous levels, the implementation of an initial cap may have the added benefit of facilitating development of A-Grade office space during office downturns as developers look to take advantage of the opportunity before it is exhausted. Council also has the option to review the cap at certain development thresholds to determine if it is appropriate to extend the scheme. • A residential development cap would allow a maximum amount of residential floorspace to be developed within the Commercial Core. This would have the benefit of allowing residential development in the Commercial Core to help facilitate the development of A-Grade office space in certain market conditions. At the same time, the cap would limit the total amount of residential space that could be developed and ensure that employment uses remain the primary use in the Commercial Core • A residential development cap is considered to be easier to administer compared to transferable development rights • This is subject to adequate sites being identified as suitable to accommodate horizontal mixed-use development.
Remove maximum FSR and height controls for office development that achieve floorplates of 1,500 sq.m.	Remove maximum FSRs for A-grade commercial office development in the Commercial Core and be more flexible on allowable building heights for commercial development.	• Maximum FSRs are considered to be relatively arbitrary. If a developer is willing to develop a large A-Grade office (with floorplates of over 1,500 sq.m) that exceeds maximum FSRs, it is considered that it should be supported provided that it can meet other design and impact requirements. While it is unlikely to have a major impact on office viability in the short to medium term, there is considered to be value in increasing flexibility in the long term • This recommendation aligns with the Parramatta CBD Planning Strategy, which recommends non-residential floorspace above the minimum requirement not count

Recommendation	Description	Justification
		towards the site FSR • More flexible building heights, that still comply with Obstacle Limitation Surface (OLS) requirements around Sydney airspace, will encourage developers to maintain greater ceiling heights, which is attractive to large A-Grade tenants
Applying maximum FSR for small lots.	Only allow unlimited office space in the B3 Commercial Core for those sites over 1,800 sq.m to promote site amalgamation.	• The trend in office development in recent years has been towards buildings with larger floorplates over 1,300 sq.m (and generally over 1,500 sq.m) that allow tenants to take fewer floors and improve staff interaction. Small sites should be offered incentives to amalgamate to help facilitate developments that are desired by the market and achieve economic development outcomes • Urban design testing by Council has indicated that sites of over 2,500 sq.m are generally required to achieve floorplates of 1,500-1,800sq.m subject to site orientation, street frontage and ability to achieve inter-building separation and street setbacks. Developing smaller lots has the negative impact of 'quarantining sites' for a long period of time, with a long term view needed to be taken to ensure sufficient large sites to develop A-grade office. Over time, some older existing A-grade office buildings are likely to transition to B-Grade buildings, which results in an ongoing diverse supply of office space opportunities and levels of affordability, making it important that new A-grade office space is developed to maintain sufficient high quality space.
Complementary design code for residential uses.	Develop built form controls so that any residential development in the CBD area is of a 'commercial aesthetic'.	• The design of some mixed-use residential developments around the Commercial Core is becoming inconsistent with the intention to promote Parramatta CBD as an employment destination and encourage the supply of A-Grade office space. External balconies that are cluttered in appearance or that do not reflect the surrounding commercial aesthetic are not attractive to large corporate businesses that want to be located in a commercial environment that aligns with their corporate image • Design controls should be set with a high design benchmark and outline the requirement for residential to include a commercial aesthetic that is complementary to office development, particularly if residential development is to be considered in the Commercial Core in exceptional circumstances (see the recommendations above).

Recommendation	Description	Justification
Expansion of Commercial Core.	Expand the Commercial Core to create a more cohesive commercial precinct and integrate key commercial nodes. Includes connecting the existing core to the Justice Precinct and Westfield Parramatta.	• The existing Commercial Core is generally focussed around the Parramatta Train Station and the area directly to the north. However, there are nodes such as the Justice Precinct that have developed into key office precincts, though they are separated from the existing core • In addition, Westfield Parramatta and Parramatta Square have been identified as having potential to accommodate significant A-Grade office space. • It would be considered beneficial to have a single contiguous commercial core and that areas such as the Church Street dining precinct be protected by relevant heritage and solar access provisions, whilst providing some surety and clear positioning for areas such as the Justice Precinct as a key commercial area.
Auto Alley Precinct.	Continue to encourage non-residential employment generating land uses in the Auto Alley Precinct.	• The Auto Alley Precinct represents an opportunity to facilitate mixed-use development though is not considered likely to attract A-Grade office development in the short-medium term as the majority of new office development will be focused around the Parramatta Train Station and the commercial core north of the rail line. We also acknowledge that the Auto Alley Precinct has constraints due to the bisection by the highway and constrained walkability and connection to existing transport and commercial nodes. In addition, if the potential quality of residential development in Auto Alley is not of a high standard with a style that is not consistent with the required commercial character, this may deter potential A-Grade tenants • It is considered there may be opportunities for A-Grade office space in the long term, once other more attractive areas have been developed, though is not likely to be attractive or financially viable in the current market • It is considered that smaller office and other employment generating uses such as car showrooms represent a good employment generating outcome in the short-medium term.

DISCLAIMER

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In preparing this report, Urbis was required to make judgements which may be affected by unforeseen future events, the likelihood and effects of which are not capable of precise assessment.

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This report has been prepared with due care and diligence by Urbis and the statements and opinions given by Urbis in this report are given in good faith and in the reasonable belief that they are correct and not misleading, subject to the limitations above.

APPENDIX A CONSULTATION FINDINGS

Urbis undertook consultation in 2015 with commercial office owners and developers active in Parramatta to inform the assessment of the potential for mixed-use development in the Parramatta CBD and the attraction of A-Grade office space. The following key themes emerged from the discussions and included:

- Parramatta Office Market
  - Participants mentioned that the Parramatta Square development has the potential to act as a catalyst for additional office development through the attraction of major corporate tenant(s) such as the Commonwealth Bank of Australia. However, the development of significant office space for one tenant increases the risk and discount rates associated with the development
  - Several major businesses and government agencies are looking for office space within the Parramatta CBD with requirements for around 10,000 sq.m each. Government pre-commitments would be the most attractive to potential developers as they are usually on longer lease periods that reduce the risk associated with the project
  - Office tenants are looking to move away from business park locations to CBD locations to take advantage of better amenity and transport linkages that improve key staff retention and attraction. This represents a reversal after a large number of companies moved away from CBDs to business parks (such as Macquarie Park and Norwest) in the last 20 years
  - There was consensus from participants that A-Grade office buildings of between 20,000 to 25,000 sq.m represent the most viable size for the Parramatta CBD. It was mentioned that larger developments such as what is proposed in Parramatta Square represent a risk to developers and owners as there are not many tenants capable of accommodating that quantum of space. This can result in significant vacancies if the original tenant moves out in the future
  - Large office buildings of over 40,000 sq.m are difficult to develop as they require major pre-commitments. The North Sydney CBD has had trouble developing buildings of this size in recent years due to difficulties in securing pre-commitments
  - Prospective A-Grade tenants are asking for floorplates of at least 1,300 sq.m though preferably over 1,500 sq.m.
- Residential in Commercial Core
  - Participants had slightly different views on allowing residential in the Commercial Core though generally there was no major concerns with having residential in the Commercial Core as long as it is developed to a high quality, with sufficient separation from office buildings that will not cause impacts on commercial tenants. Some participants pointed to Chatswood as an example of too much residential being developed
  - Some participants outlined the experience of Chatswood, which has allowed significant residential that has impacted the office market in recent years and Chatswood has lost its 'identity' as an office CBD. This has changed tenant perceptions of the Chatswood CBD from a dedicated CBD to an area with more of a residential/retail feel. This has reduced the pool of potential tenants, which has made it harder to fill space
  - Multiple participants mentioned that residential development also helps to activate the CBD and results in 'passive surveillance' of office buildings that is attractive to tenants by improving safety for staff working late
  - A common theme from participants was the importance to retain sufficient land for commercial development in the future as residential development permanently 'locks' sites from future development due to strata sub-division.

- Constraints of Mixed-Use Development
  - The strata titling of residential apartments was a major concern to office owners as they lose full control of the building and site
  - Participants highlighted that residential apartments above office can have negative impacts on the office users such as shared car parks and overall amenity. Some participants anticipated vertical mixed-use developments would have a lot of trouble in securing tenants with a likelihood that there will be vacancies and developers/owners may look to convert office to other uses in the future
  - Some participants highlighted that vertical mixed-use developments can increase the cost of design and construction as issues around lift cores and building separation need to be carefully planned, which can also reduce building efficiency
  - Overall, all participants would not pursue a vertical mixed-use development (i.e. residential apartments above a significant supply of commercial floor space) in Parramatta though one participant has preliminarily considered (unsuccessfully) the potential for premium vertical mixed-use development in the Sydney CBD.
- Attractiveness of Mixed-Use Development
  - Multiple participants believed residential apartments (in the current market) can underpin the viability of the development to the point where the commercial office component is developed speculatively. Some participants even believed residential focussed developers could justify projects through the sale of the residential apartments even if most of the office space remained vacant
  - A lot of developers are attracted to mixed-use developments as they look to make their money upfront out of the sale of apartments rather than ongoing rental cashflows
  - All participants highlighted that mixed use developments are most successful when the residential apartments are of a very high quality and attract affluent owner occupiers. This reduces potential conflicts between workers and residents
  - Residential increases activity and vibrancy in a CBD location by supporting retail and hospitality that is also attractive to office workers
  - Mixed-use developments need to have separate titles for the residential and office components so they can be sold separately. This requires much larger sites to support multiple buildings, which are often scarce in CBDs.
- Attracting A-Grade Office to Parramatta CBD
  - It is difficult for Council to influence the demand for office buildings unless there is a pre-commitment to space by a tenant. Consequently, Council's most effective method of facilitating office development is through reducing development costs
  - The City of Parramatta could utilise Council-owned landholdings such as carpark sites to facilitate office development. However, Council's asking price for sites would have to be reduced to facilitate viable development under market conditions at that time
  - The City of Parramatta could reduce development contributions to reduce the cost of office construction and improve viability under market conditions at that time
  - Increased or uncapped FSRs for office space are unlikely to help promote development as 25,000 sq.m buildings are probably the largest that can be viably developed in Parramatta. Larger buildings would require a major tenant pre-commitment, which are very difficult to come by.

- Implications for Parramatta CBD
  - All participants believed commercial office needs to remain the 'predominant' use so that the Parramatta CBD retains its commercial feel that is desirable to the image of major corporations that may look to relocate to the CBD
  - Any residential apartments developed in the CBD should be developed to a high quality aesthetic with angled and/or enclosed balconies and sufficiently separated from office buildings
  - Participants stated Parramatta should avoid poor quality office developments that sit vacant as this can negatively impact the overall market and future development potential. This is likely to be the case for large vertical mixed-use developments (i.e. residential apartments above significant commercial floor space), which would be developed speculatively, and would be unlikely to attract A-Grade tenants
  - Mixed-use developments with separate office and residential buildings on separate titles could promote viable development. However, this requires much larger sites of which there are few in the Parramatta CBD
  - Residential development in the current market has the potential to support the viability of A-Grade office space in a mixed use development. However, this is only likely to support the viability of a certain amount of office space and does not remove the need for a minimum amount of tenant per-commitment
  - Some participants stated the need for State and Commonwealth Government to support the development of office space through pre-committing to new office space
  - A-Grade needs to have a floorplate of at least 1,300 sq.m though preferably over 1,500 sq.m
  - Some participants stated Council's ability to help support viable development through reducing the cost of development such as through subsidised land or lower development contributions.

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Appendix 3 – Parramatta High Performance Building Study (Kinesis, 2023)

KINESIS

PARRAMATTA CBD

HIGH PERFORMANCE BUILDING STUDY REVIEW

PREPARED BY KINESIS FOR CITY OF PARRAMATTA

FINAL REPORT – 6 DECEMBER 2023

Note: This report is provided subject to some important assumptions and qualifications:

The results presented in this report are modelled estimates using mathematical calculations. The data, information and scenarios presented in this report have not been separately confirmed or verified. Accordingly, the results should be considered to be estimates only and subject to such confirmation and verification.

Energy, water and greenhouse consumption estimates are based on local climate and utility data available to the consultant at the time of the report. These consumption demands are, where necessary, quantified in terms of primary energy and water consumptions using manufacturer's data and scientific principles.

Generic precinct-level cost estimates provided in this report are indicative only based on Kinesis's project experience and available data from published economic assessments. These have not been informed by specific building design or construction plans and should not be used for design and construct cost estimates.

The Kinesis software tool and results generated by it are not intended to be used as the sole or primary basis for making investment or financial decisions (including carbon credit trading decisions). Accordingly, the results set out in this report should not be relied on as the sole or primary source of information applicable to such decisions.

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5 (Final)	7/12/2023	Harish Moro, Senior Consultant

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CONTEXT FOR THIS ADDENDUM

The City of Parramatta's LEP incentivises higher sustainability in new residential and mixed-use developments through a floorspace bonus scheme. The incentive structure requires a set of BASIX targets linked to the height of the proposed building and FSR.

The BASIX system is undergoing an overhaul through the introduction of Sustainable Buildings SEPP. This includes revised compliance targets as well as BASIX calculator updates that incorporate policy, technology and industry trends.

The City has engaged Kinesis to understand the impact of these updates to the BASIX system and recommend updated targets for the LEP controls to continue to incentivise high performance buildings in Parramatta CBD.

This is an addendum report that details the modelling and evidence base for updated BASIX targets. It should be read alongside the original report that provides further context.

REVISED PATHWAYS

Kinesis has modelled two sustainability pathways across various building heights and FSRs to understand 2 things:

- **Achievability - What BASIX scores are achievable across different building heights**
- **Feasibility - Which pathways are cost-effective across different FSRs**

The three pathways modelled are described in Table 1.

- Pathway 1 configured to simulate an all electric development that just complies with the new BASIX targets. Note there are many pathways to achieve compliance and this represents one such pathway.
- Pathway 2 incorporates building efficiency sustainability interventions that are readily available in the market. No solar PV is assumed to consider challenges including limited roof space given green roof requirements, overshadowing, etc.
- Pathway 3 incorporates the building efficiency interventions from pathway 2 + rooftop solar PV

It should be noted that a connection to a recycled water system or a rainwater reuse system is considered under all three pathways.

PATHWAY TECHNOLOGY ASSUMPTIONS

	Compliance pathway	Pathway 2	Pathway 3
Dwellings			
NatHERS	7-star average	8-star average	8-star average
Hot Water	Electric instantaneous hot water with internal piping insulated (R-value of 0.6)	Individual electric heat pump hot water systems with 41-45 STCs	Individual electric heat pump hot water systems with 41-45 STCs
Space Heating & Cooling	2.5-star average zone A/C (living & bedroom areas)	5-star average zone A/C (living & bedroom areas)	5-star average zone A/C (living & bedroom areas)
Lighting	LED lighting	LED lighting	LED lighting
Solar			Typically 0.02 kW per sqm site area (BASIX data of residential mixed use apartment buildings in Parramatta).
Appliances	Not mentioned	5-star energy & water dishwasher, 9-star clothes dryer, electric oven and induction cooktop, indoor (or under-cover) clothes drying line	5-star energy & water dishwasher, 9-star clothes dryer, electric oven and induction cooktop, indoor (or under-cover) clothes drying line
Water Fixtures	4-star WELS toilet, 5-star WELS taps, 4-star WELS showerhead	4-star WELS toilet, 5-star WELS taps, 4-star WELS showerhead	4-star WELS toilet, 5-star WELS taps, 4-star WELS showerhead
Ventilation	Individual fans in laundry, kitchen & bathroom with ducted to façade or roof and manual switch	Individual fans in laundry, kitchen & bathroom with ducted to façade or roof and manual switch	Individual fans in laundry, kitchen & bathroom with ducted to façade or roof and manual switch
Common area + Central Systems			
Underground carpark	LED lighting with time clock and motion sensors for carpark. Supply and exhaust ventilation with CO sensor and VSD fan installed	LED lighting with time clock and motion sensors for carpark. Supply and exhaust ventilation with CO sensor and VSD fan installed	LED lighting with time clock and motion sensors for carpark. Supply and exhaust ventilation with CO sensor and VSD fan installed
Lift	Gearless traction with VVVF motor	Gearless traction with VVVF motor & regenerative drive	Gearless traction with VVVF motor & regenerative drive
Parking	0.6 spaces/dwelling + EV charging	0.6 spaces/dwelling + EV charging	0.6 spaces/dwelling + EV charging
Water reuse (Recycled Water or Rainwater 50L per dwelling tank)		Connected for irrigation, toilet and laundry	Connected for irrigation, toilet and laundry
Parking	LED lighting with time clock and motion sensors for carpark. Supply and exhaust ventilation with CO sensor and VSD fan installed	LED lighting with time clock and motion sensors for carpark. Supply and exhaust ventilation with CO sensor and VSD fan installed	LED lighting with time clock and motion sensors for carpark. Supply and exhaust ventilation with CO sensor and VSD fan installed

Table 1: Pathway technology assumptions

BASIX COMPLIANCE TARGETS BY BUILDING HEIGHT

Table 2 below shows the translation between BASIX Energy targets under the old governance system and the updated BASIX Energy targets under the Sustainable Buildings SEPP that take effect from 1 October 2023. The old BASIX Energy targets did not differentiate by height above 6 storeys. The new ones do. BASIX Water targets remain unchanged.

	Old BASIX Energy Targets	New BASIX Energy Targets from Sustainable Buildings SEPP (from 1 October 2023)
Low rise (3 storeys)	45	67
Mid rise (4-5 storeys)	35	61
High rise (6 – 20 storeys)	25	60
High rise (20 storeys & higher)	25	63

Table 2: Old and New BASIX targets under the Sustainable Buildings SEPP

The two pathways were modelled across different building heights ranging from 5 storeys to over 40 storeys. The modelling was undertaken using the BASIX Sandbox calculator and validated through Kinesis' own precinct modelling software to manage for any bugs and issues with the BASIX sandbox calculator. Through the modelling, Kinesis identified four height bands between which the BASIX scores achievable from the pathways varied significantly. They can be summarised as:

- **5-15 storey**
  Can achieve high BASIX overcompliance
- **16-30 storey**
  A step change in common area and centralised energy loads. E.g., increased lifts, common area lighting, etc.
- **31-40 storeys**
  Limited roof space reduces the impact of on-site renewables on higher BASIX scores. Increased non-residential floorspace and associated centralised energy demand further decreases BASIX scores achievable through efficiency measures.
- **Beyond 40 storeys**
  Difficult to achieve BASIX overcompliance without best practice efficiency measures and appropriate lift efficiency settings including regenerative lifts and optimised/ efficient servicing of floors.

*Note: As buildings get taller common area energy loads increase from more lifts, lighting, ventilation, etc. Typically buildings over 40 storeys have 4-5 lifts. These lifts need to be regenerative and configured to efficiently service the various floors of the building to achieve BASIX overcompliance. Solar PV also has a smaller impact as buildings get taller. This is because the energy generated from the solar PV remains constant but the energy demands increase as height increases. The specific BASIX scores achievable under the three pathways for each of the 4 building height bands are outlined in Table 3. Pathway 1 simulates compliance. Pathway 2 and 3 can exceed BASIX compliance by the number of points indicated by "+X".

Note: BASIX Energy compliance scores are 63 for high rises over 21 storeys and 60 for high rises between 6-20 storeys. The overcompliance scores in the table below incorporates this higher compliance score. That is, for example if pathway 2 is implemented for a building 16-30 storeys tall, it would BASIX Energy 70 for buildings between 16-20 storeys and BASIX Energy 73 for buildings between 21-30 storeys.

BASIX PERFORMANCE UNDER THE THREE PATHWAYS BY BUILDING HEIGHT BAND

	Pathway 1	Pathway 2	Pathway 3
5-15 storeys	Compliance	BASIX Energy +12 BASIX Water +15	BASIX Energy +25 BASIX Water +15
16-30 storeys	Compliance	BASIX Energy +10 BASIX Water +15	BASIX Energy +20 BASIX Water +15
31-40 storeys	Compliance	BASIX Energy +10 BASIX Water +15	BASIX Energy +15 BASIX Water +15
Greater than 40 storeys*	Compliance	BASIX Energy +10 BASIX Water +15	BASIX Energy +15 BASIX Water +15

Table 3: BASIX performance under the three pathways by building height band

Note on achieving 8 star NatHERS

- The maximum energy load thermal for 7 star NatHERS is 30 MJ per sqm per annum
- The maximum energy load thermal for 8 star NatHERS is 22 MJ per sqm per annum

8 star NatHERS can be achieved through well considered materials, façade design, dwelling layout/ orientation and sizing, shading elements, glass performance, and acoustic treatment. Two example apartment buildings that have achieved 8 star NatHERS are provided below.
Omega Apartments with 8 star natHERS ESD rating - Cottee Parker
Australia's greenest apartments set to take shape in Clar... (urban.com.au)

Note on recycled water

- Recycled Water is the recommended mechanism under Pathway 2 and 3 to achieve higher BASIX Water scores.
- At the scale of development expected for the CBD, the implementation of a precinct wide recycled water system would be most effective.
- The performance standards above incorporate a recommendation that dual reticulation is incorporated into residential buildings for both internal and external uses to enable recycled water in the future (see *Performance Standards for Future Proofing in original report*).

TESTING THE FEASIBILITY OF THE PATHWAYS BY FSR

A floor space bonus is proposed for new residential development that meets higher BASIX targets. In order to determine whether the costs associated with improved development outcomes are of a magnitude that ensures the floorspace bonus is taken up, the value of the floor space bonus must be determined. This can be done from two lenses.

1. A land value uplift lens which considers how Council can leverage the financial benefit from increased land value to incentivise higher sustainability performance. This is limited in its consideration of incentives and costs associated with the floorspace bonus scheme.
2. A more holistic approach which considers the additional revenue and costs associated with delivering additional dwellings from the floorspace incentive scheme.

LENS 1 - LAND LIFT VALUE = THE VALUE OF INCREASED LAND AREA

In Lens 1, the value the floorspace bonus has been calculated based on a land lift calculation. Land lift calculates the additional value added to the land which is attributable to the increased floor space. The increased floor space can be compared to creating new land and the value of this land can be calculated based on current land values. The lift in value is determined by multiplying the additional floor space by the "buildable rate". The buildable rate is the current land value divided by the floor area allowed by the current FSR.

Land Lift = ((Land Area x Land Value) / Base Floor Area) x New Additional Floor Area
This simplifies to:
Land Lift = Land value x Land area x 0.05

Example:

- Land Area = 5,000 m2
- Base floor area under current FSR = 30,000 m2
- Current land value = $12,000 per m2 of land
- Additional floor space under FSR Bonus = 1,500 m2
- Land lift = $3,000,000

Under this approach the additional financial benefit attributed to increased land value is attributed to Council and can be used to deliver improved performance outcomes while the additional financial benefit derived from the additional development (e.g. sale of apartments) flows through to the developer. Typically, cities around the world capture between 50% and 100% of this land lift for use in the delivery of improved development, environmental or social outcomes. An example of a floorspace incentive introduced by the NSW state government can be seen here: Social and affordable housing reform – Frequently asked questions (nsw.gov.au)). This example shows that the structure of Parramatta's floorspace incentive scheme is similar to NSW Government's scheme.

To maximise the utilisation of the floor space bonus scheme, it is important to ensure the benefits of the floor space bonus are of a magnitude that provides adequate incentive for developers to meet this enhanced standard. This was determined by comparing the land lift value to the expected marginal capital cost incurred under Pathways 2 and 3 that would deliver BASIX overcompliance. For the purposes of this analysis, feasibility is defined as instances where the land lift value exceeds the cost of implementing these higher BASIX pathways. FSRs up to 16:1 have been included in the modelling in the case of clause 4.6 variations and as an evidence base for planning proposals.

COST BENEFIT ANALYSIS - LAND LIFT VALUE VS COST OF HIGHER BASIX

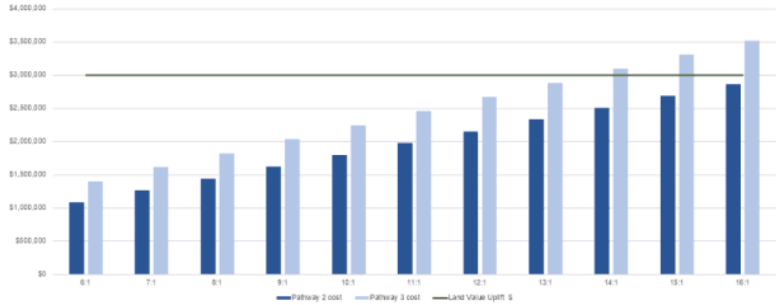

Figure 1: Land Lift Value compared to marginal cost of implementing the two sustainability pathways Land Lift Value is higher that the marginal cost of higher building performance under both pathways.

For a given site area, as the FSR increases:

- The 5% floorspace bonus results in the same land lift value (assuming land value is the same across all lots)
- The cost of implementing the pathways increases with number of dwellings or residential floorspace

Kinesis has considered a standard lot area and estimated the costs and the benefit under each of the pathways for all viable FSRs ranging from 6:1 to 16:1. Noting that the Council team has informed Kinesis that there is a FSR incentive cap of 16:1 in the Parramatta CBD. The cost of implementing the pathways is however sensitive to:

- Delivery costs for various sustainability interventions*
- Number of dwellings

Lens 2 aims to consider these incentives and costs more holistically from the perspective of the market as shown in the next page.

LENS 2 – ADDITIONAL REVENUE = THE VALUE OF ADDITIONAL FLOORSPACE & DWELLINGS AND THE COSTS ASSOCIATED WITH ITS DELIVERY

Number of dwellings

This approach considers the potential financial benefit from additional development (through the sale of additional apartments) that can be realised by the market through the floorspace bonus scheme. The analysis shown here is indicative of the incentive available. Developers will need to do a feasibility analysis on a case-by-case basis.

The revenue, costs and margins that developers can realise through the floorspace bonus scheme under pathways 2 and 3 are shown in the charts to the right.

- The cost of delivering higher BASIX to become eligible for the floorspace bonus is indicated in blue bars.
- The revenue from selling additional apartments built using the floorspace bonus is shown by the purple line.
- The various cost associated with delivering the additional dwellings is shown in shades of orange. They include construction costs, finance costs and infrastructure costs associated with delivering the dwellings.
- The margin that developers can realise from the additional dwellings delivered through the floorspace bonus scheme is shown in green.

As such, developers can make a margin under pathways 2 and 3. Through this lens, pathway 3 is feasible for all FSRs from 6:1 to 16:1.

Other costs of building out such as land costs, professional fees, marketing and sales are regarded as fixed costs that would have been incurred irrespective of the additional dwellings that can be delivered through the Floorspace bonus scheme. As such, they are not included in this comparison.

COST BENEFIT ANALYSIS OF PATHWAY 2 – REVENUE VS COSTS

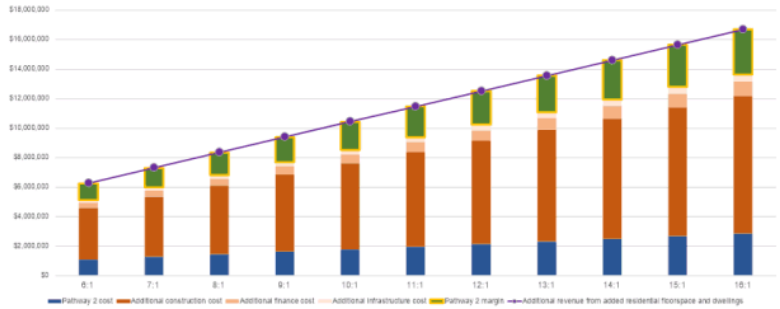

Figure 2: Revenue and costs of floorspace bonus under pathway 2

COST BENEFIT ANALYSIS OF PATHWAY 3 – REVENUE VS COSTS

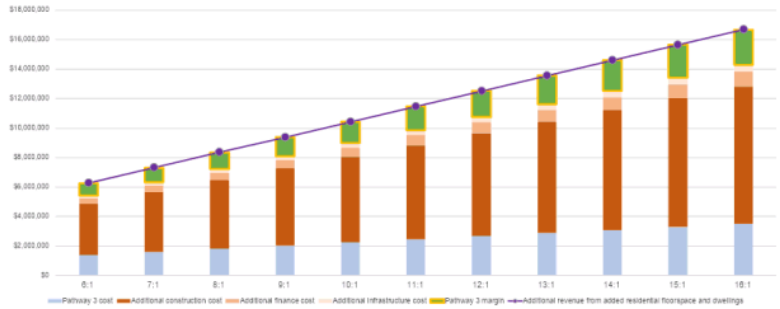

Figure 3: Revenue and costs of floorspace bonus under pathway 3

Feasibility modelling notes:
Given that the cost of the pathways vary based on delivery costs and number of dwellings, the feasibility of the pathways would need to be tested on a case by case basis by developers. This analysis simply provides a rule of thumb as to which pathways are feasible across different FSRs. As a minimum, Pathway 2 is feasible under all FSRs and the targets have been set accordingly. Key assumptions used in this analysis are outlined below.

1. Land area and land value

- Standard lot area of 5,000 sqm across each FSR from 6:1 to 16:1
- Land value of $12,000 per sqm of land (land value estimate based on data from realcommercial.com.au, Valuer General NSW and domain.com.au). Land value will likely vary based on FSR zoning but there is insufficient data to determine this appropriately. As such, consistent land value of $12,000 per sqm has been applied across the board.

2. Marginal capital cost of delivering Pathways 2 and 3 relative to compliance Pathway 1

	Pathway 1 – compliance	Pathway 2	Pathway 3
Marginal Capital Cost	$0 / dwelling	$5,000/ dwelling + $20k extra for regenerative lifts	$7,000/ dwelling + $20k extra for regenerative lifts + 100k for 100 kW (0.02 kW per sqm site x 5000 sqm)

Table 4: Marginal capital cost for pathways 2 and 3

Kinesis has undertaken market research and provided an estimate of the marginal capital cost of delivering Pathways 2 and 3 relative to Pathway 1 (simulating compliance). These costs however can vary significantly as for example, with appliance costs. We have obtained appliance costs from a range of retailers. Appliances with the same rated performance come in a range of prices depending on the brand and the retailer. Sometimes, the prices can deviate from the median price by over 20%. For example, a 9 star heap pump dryer can be priced anywhere between $1,500 to $2,500. Kinesis has collated the range of capital costs under all three pathways in Table 4. Our analysis has assumed the lower end of capital costs. This is reasonable as developers can negotiate large purchase agreements and realise cost efficiencies while implementing the pathways.

3. Number of dwellings

The cost of implementing the pathways scale with the number of dwellings whereas the land lift value from the FSR benefit does not. In this analysis, the typical number of dwellings has been estimated for each FSR. Through analysis of the BASIX certificates, we have estimated the average proportion of residential floorspace to total GFA in a building as 50% and average apartment sizes as 72-73 sqm. Therefore, for a 5,000 sqm site, Table 5 provides the yield metrics that are relevant to the calculations

FSR	6	7	8	9	10	11	12	13	14	15	16
Baseline GFA (sqm)	30k	35k	40k	45k	50k	55k	60k	65k	70k	75k	80k
Bonus GFA	1.5k	1.75k	2k	2.25k	2.5k	2.75k	3k	3.25k	3.5k	3.75k	4k
Total dwellings	205	240	274	308	342	376	411	445	479	513	548
Additional dwellings	10	12	14	15	17	19	21	22	24	26	27

Table 5: Estimate of number of dwellings by FSR

4. Additional revenue and cost assumptions

The median price of an apartment dwellings in Parramatta CBD is $610,000 as at October 2023.
Source: https://www.realestate.com.au/nsw/parramatta-2150/

The RBA has provided indicative cost of building out in Sydney. The three cost items relevant for this analysis is shown below.
The Cost of Building Out | RDP 2020-04: The Apartment Shortage | RBA

Cost of Building out (Sydney average)	$ per apartment dwelling
Construction cost	340,000
Finance	36,000
Infrastructure charges	18,000

RECOMMENDED TARGETS BY FSR & HEIGHT BANDS

City of Parramatta have noted that the floor space bonus is available to residential and mixed-use developments in the CBD for various height brackets.

The findings in this report have outlined that:

1. Achievability of higher BASIX depends on building height and
2. Both sustainability pathways are feasible for the range of FSRs

Based on the modelled BASIX performance by building height band (Table 3) and the cost benefit analysis in Figure 3.

- Table 6 highlights the BASIX performance standards that are achievable for new residential and mixed-use development across the Parramatta CBD over and above the BASIX compliance standards proposed in the Sustainable Buildings SEPP to take effect from October 2023.
- Developers can achieve these targets by pursuing Pathway 3 for FSR ranging from 6:1 to 16:1

Building height	BASIX overcompliance requirements
5-15 storeys	BASIX Energy +25, BASIX Water +15
16-30 storeys	BASIX Energy +20, BASIX Water +15
31-40 storeys	BASIX Energy +15, BASIX Water +15
41+storeys	BASIX Energy +15, BASIX Water +15

Table 6: BASIX performance targets by building height band for full range of FSRs

The prescribed targets by discrete building height bands have been developed by observing consistent sustainability performance across building heights within each of the height bands – 5-15 storeys, 16-30 storeys, 31-40 storeys and 40+ storeys.

Two examples,

1. A developer intending to build a 20-storey residential development with a 14:1 FSR in Parramatta CBD would need to achieve BASIX Energy +20 and BASIX Water +15 over proposed BASIX compliance requirements through the Sustainable Buildings SEPP of BASIX Energy 60 and BASIX Water 40.

2. A developer intending to build a 55-storey residential development with a 11:1 FSR in Parramatta CBD would need to achieve BASIX Energy +15 and BASIX Water +15 over current BASIX compliance requirements of BASIX Energy 63 and BASIX Water 40.

IMPACTS TO DEVELOPERS FROM PROPOSED CHANGES TO FSR BONUS SCHEME TARGETS

The Sustainable Buildings SEPP has made significant changes to the BASIX system. In summary:

- Homes built to the current BASIX standard range between 5.5 and 6 star NatHERS on average. The new thermal performance standards will increase to 7 stars. This is the same thermal performance as that proposed for the National Construction Code in 2022.
- BASIX energy standards have increased as described in Table 2.
- The greenhouse gas emission factor is the amount of emissions (expressed as kilograms of carbon dioxide equivalent (kg CO2-e)) generated and transmitted from each unit of grid electricity to households. BASIX currently uses an emission factor of 1.062 kg CO2-e for each kilowatt-hour (kWh) of electricity. Under the new system, a 10-year average from 2022 to 2031 (or 0.67 kg CO2-e/kWh) will be adopted for calculating BASIX energy scores from 2022.
- Current industry practice such as LED lighting and appliance efficiency is assumed as default in the BASIX calculator.

These changes do make it slightly harder to achieve higher BASIX targets but as outlined in the modelling, there are feasible, practical pathways to achieve this.

Consider the following two development examples of differing site area and typology:

Address	14-20 Parkes Street	180 George Street
Site Area (sqm)	2,829.7	7979
Base FSR (ratio)	10	10
Design Excellence Bonus FSR (ratio)	1.4 (+15%)	1.5 (+15%)
Total FSR (ratio)	11.4	11.5
Total GFA (sqm)	32280	91753
Total Apartments (dwellings)	331	767
Bonus GFA (sqm)	1415	3989
Additional dwellings (dwellings)	14	33

Cost-benefit through lens 1

Address	14-20 Parkes Street	180 George Street
Land value uplift	$1.4m	$4.1m
Cost of higher BASIX pathway 3	-$1.7m	-$4m
Total construction cost	$69m	$228m
Cost of higher BASIX as % of total construction cost	3%	2%

Sources for development value:
14-20 Parkes Street; 180 George Street

Cost-benefit through lens 2

Address	14-20 Parkes Street	180 George Street
Additional revenue from additional dwellings	$8.8m	$20.3m
Cost of higher BASIX pathway 3	-$1.7m	-$4.0m
Construction cost of additional dwellings	-$4.9m	-$11.3m
Finance cost of additional dwellings	-$0.5m	-$1.2m
Infrastructure charges of additional dwellings	-$0.25m	-$0.6m
Developer margin	+$3.1m	+$7.2m

FUTURE PROOFING FOR FURTHER UPDATES TO BASIX POLICY

After its introduction in 2004, there were only two changes to BASIX targets. Once in 2017 and in October 2023 through the Sustainable Buildings SEPP.

Despite these changes, the benchmark or baseline remains 3,292 kilograms of carbon dioxide per person per year, which was the average for pre-BASIX homes. The two changes in 2017 and 2023 have been to the minimum compliance targets and the levers in the BASIX calculator.

Based on this history, we could assume that the BASIX benchmark may remain the same but the compliance requirements (required performance relative to this benchmark) can change.

Substantial additional work is required to provide pathways that avoid frequent future reviews with minor changes to the BASIX. Such work can be undertaken only when there are significant changes in BASIX requirements, such as a certain percentage increase in compliance scores, rather than every minor change.

Notwithstanding, we have provided two recommendations to manage for updates to the BASIX policy.

1. Council may consider replacing the current BASIX +X targets with the equivalent percentage improvement over BASIX compliance targets. See the last column.

Building height	New BASIX compliance targets from Sustainable Buildings SEPP (from 1 October 2023)	BASIX overcompliance requirements (incremental BASIX points)	BASIX overcompliance requirements (actual targets)	BASIX overcompliance requirements (% increase over compliance targets)
5-15 storeys	BASIX Energy 60, BASIX Water 40	BASIX Energy +25, BASIX Water +15	BASIX Energy 85, BASIX Water 55	BASIX Energy – 42% BASIX Water – 38%
16-20 storeys	BASIX Energy 60, BASIX Water 40	BASIX Energy +20, BASIX Water +15	BASIX Energy 80, BASIX Water 55	BASIX Energy – 33% BASIX Water – 38%
20-30 storeys	BASIX Energy 63, BASIX Water 40	BASIX Energy +20, BASIX Water +15	BASIX Energy 83, BASIX Water 55	BASIX Energy – 32% BASIX Water – 38%
31-40 storeys	BASIX Energy 63, BASIX Water 40	BASIX Energy +15, BASIX Water +15	BASIX Energy 78, BASIX Water 55	BASIX Energy – 24% BASIX Water – 38%
41+storeys	BASIX Energy 63, BASIX Water 40	BASIX Energy +15, BASIX Water +15	BASIX Energy 78, BASIX Water 55	BASIX Energy – 24% BASIX Water – 38%

2. Over the long term, it is expected that the industry moves towards net zero buildings or BASIX 100. As this approaches, it is unclear how the BASIX policy will maintain its relevance in this setting. BASIX Energy compliance targets are already above 60 points and the overcompliance requirements under the floorspace bonus scheme puts it at 78-85 points. In the next upgrade of BASIX, council can consider proactive adjusting the floorspace bonus scheme incentive to completely move away from BASIX target and simply require delivery of net zero buildings.

KEY DATA SOURCES

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- Cost assumptions from
  - online appliance retailers including Appliances Online, Harvey Norman, Bing Lee, The Good Guys,
  - Kingspan water tanks
  - Solar choice - solar PV
- ACADS-BSG Australian Climatic Data (Reference Meteorological Year, RMY) for hourly temperature, insulation and humidity.
- Bureau of Meteorology local rainfall and evaporation data
  - Data is from the representative weather station for the local climate zone
  - The RMY (Representative Meteorological Year) is synthesized from a composite of 12 typical meteorological months that best represent the historic average of the specified location using post-1986 data in addition to the earlier weather data for each of the 69 climate zones in Australia.
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Appendix 4 – Parramatta Integrated Transport Plan (2021)

CITY OF PARRAMATTA

Parramatta Integrated Transport Plan

July 2021

cityofparramatta.nsw.gov.au

Parramatta Integrated Transport Plan

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Client Name:	City of Parramatta
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1.5	18/09/20	Revised draft	CM	MM	MM	
1.6	08/04/21	Revised draft – LRA Added	CM	MM	MM	
2	07/07/21	Revised draft	CM	MM	MM	

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Executive Summary

Parramatta Central Business District (CBD) is one of Australia's leading regions, and an area of strategic importance located at the hub of the 'Central River City'. Currently it performs a key economic, social and cultural role within Greater Sydney. However, as Western Sydney's population continues to grow, the city is experiencing rapid growth as a metropolitan employment centre.

Figure 1: Planning Proposal Boundaries

This Integrated Transport Plan (ITP) for Parramatta CBD responds to the Parramatta CBD Planning Proposal, which has been prepared to amend the planning controls for the Parramatta CBD. Changes to the planning framework are needed to grow the Parramatta CBD to realise its full potential. This planned growth will generate significant travel demand to/from Parramatta CBD, placing greater demand on transport infrastructure and services. The planning proposal needs to be supported by a number of studies, including this ITP, which recommends a strategic plan to manage the existing and future sustainable transportation needs of the CBD.

The Parramatta CBD Integrated Transport Plan will support the City of Parramatta's broader vision to be Sydney's Central City, sustainable, liveable, and productive – inspired by our communities.

The Planning Proposal will result in a significant increase in transport trips starting or ending in Parramatta CBD from just over 51,000 to almost 111,000 in the AM peak alone. Since private vehicle use is currently the preferred mode of travel for commuters, this results in a more congested road network. There is a need to influence and change commuter's mode preferences. A transformation in the city will require a considerable leap in transport planning and delivery to dramatically increase walking, cycling and public transport trips to and from the CBD.

To attract and retain businesses and jobs, Parramatta CBD must operate efficiently without reducing its liveability and walkability. The Planning Proposal supports the delivery of well-integrated developments that sustains a neighbourhood which is easy and comfortable to carry out day to day life. An emphasis on safety, affordable and diverse housing, social cohesion and inclusivity, linked by high quality public and active transport will be needed to ensure community character and attractiveness are not eroded as the CBD population grows.

The objectives for this ITP are:

1. Deliver Parramatta Light Rail and Sydney Metro West, and planning for the future transport network
2. Improve existing train and bus links to extend the 30-minute catchment for transport access to Parramatta CBD
3. Adopt forward-looking policies, demand responsive services and innovative technologies that deliver transport solutions faster, and/or lower cost
4. Prioritise delivering walking and cycling improvements and supporting access within a 30-minute walk and ride of the CBD.
5. Align transport improvements with land use change to maximise the use of new services and sustainable transport mode share among new workers and residents
6. Identify and deliver targeted improvements to the road network to improve network capacity, and where necessary manage private vehicle trips to maximise the efficiency of the surface road network to support growth.
7. Leverage transport demand management techniques proven in the Sydney context, to maximise the efficiency of all transport modes in the network.

Strategic Context

The Parramatta CBD Integrated Transport Plan is committed to addressing transport challenges through the development of a clear framework for the future planning and development of the transport system.

The ITP aligns with and is supported by several regional, district and local strategic plans including:

- Future Transport Strategy 2056 (2018)
- The Greater Sydney Region Plan: A Metropolis of Three Cities (2018)
- Central City District Plan (2018)
- Greater Parramatta and the Olympic Peninsula Place-based Infrastructure Compact Pilot: A place supported by Infrastructure (2019)
- Central City Rail: Economic Impact Study (2018)
- Western Sydney Rail Needs Scoping Study (2018)
- City of Parramatta Community Strategic Plan (2018)
- City of Parramatta Local Strategic Planning Statement (2020)
- City of Parramatta Community Infrastructure Strategy (2020)
- Parramatta Night City Framework 2020-2024 (2020)
- Socially Sustainable Parramatta Framework (2017)
- Integrated Transport Plan for Parramatta City Centre 2009/10 – 2014/15 (2010)
- Draft Parramatta CBD Planning Proposal (2020)
- Various Council Transport Strategies

The strategic direction is framed by the three geographic settings which have provided the context for thinking about Parramatta CBD's transport future at different scales. The main themes of the Parramatta CBD ITP are described below:

Greater Sydney context

The city's 'second CBD'

As the Metropolitan Centre within the 'Central River City', Parramatta CBD sits in the demographic and geographic middle of the metropolis of Greater Sydney. Because of this central location, it is in principle, the most accessible location in the entire metropolis. However, in practice, this accessibility depends the performance of transport linkages, and on intensity of the urban development and activities that generate personal and freight travel to and from Parramatta CBD.

In the context of Greater Sydney, Parramatta CBD is the city's 'second CBD'. Increasing jobs and other measures of local economic activity within Parramatta CBD requires the scale of urban development across Parramatta CBD to keep pace with the level of investment in Parramatta Light Rail and Sydney Metro West. This means that when a business is making a locational decision, they should consider Parramatta CBD as a place able to offer amenities and infrastructure as attractive as Sydney CBD, for their workers, clients and suppliers to travel to and move around.

GPOP context

Greater Parramatta: the core of the Central River City

Greater Parramatta and the Olympic Peninsula (GPOP) refers to a 6,000 hectare area at the core of the Central City, and the centre of Greater Sydney. It spans 13 km east-west from Strathfield to Westmead and 7km north-south from Carlingford to Lidcombe and Granville.

Those living midway between Parramatta CBD and Sydney CBD should have the option of looking westwards for jobs, entertainment, shopping, tertiary education and all personal and business services expected of a city centre. Moreover, the Central River City should be positioned to enjoy the added advantage of it's own growing catchment to the north, south and west. Maximising Parramatta CBD's attraction of workers and visitors from across this catchment means upgrading and creating new transit links that minimise the burden of travel time and unreliable road-based access for personal travel. As each sustainable transport improvement is put in place, measures need to be introduced to reduce the provision of parking and competition with public transport, while protecting and enhancing service access to businesses.

Parramatta CBD context

Interconnected Parramatta

Parramatta CBD strives to be a place where people want to live and work. Parramatta CBD should be strongly interconnected with its surrounding precincts that people can move around the area as one vibrant urban quarter. The light rail is one important step in achieving this but does not end there. To enjoy interesting streets, build exercise into their daily routines or simply make short trips not served by transit, the built environment of Parramatta needs to aim to offer its residents and workers the same opportunities to be able to walk or ride at the same level as those in eastern Sydney. To make space for this, and for the constant flow of goods and services moving between the Regional Ring Roads and Parramatta CBD, the private car needs to gradually play a subsidiary role to free up space for public and active transport and commercial vehicles.

Common to all three themes is 'the MaaS opportunity'

Mobility as a Service (MaaS) refers to a service model that enables customers to plan and pay for their journeys using a range of services via a single customer interface. It has the potential to enable customers to access integrated, easy-to-understand journeys in a broad market of transport services. As technology improves, it is expected that its business model will play greater role in integrating services into fewer journeys for travellers making trips at every scale to and from Parramatta CBD.

Future transport network planning needs to be multimodal and consider how the whole network functions

Despite being one of the least space efficient modes, private vehicles continue to be a major mode of travel for work and other purposes in Parramatta. Increase in car traffic with its associated noise and safety impacts would adversely affect the walking and cycling amenity of Parramatta's streets. Added congestion on the road network would further slow buses, reduce their reliability and attractiveness of public transport. It is therefore crucial to manage the roads to discourage increases in traffic so to allow alternative modes of travel to be promoted. With the predicted increase in population and employment, the efficient use of road space becomes ever more critical.

To this end there needs to be more people than today walking and bike-riding within the 5km catchment that takes in precincts within the Parramatta Outer Ring Road boundary. Beyond this distance, bike-riders can take advantage of the river and creek-based green corridors that cross the Parramatta catchment. Demand-responsive bus, minibus and point-to-point services are able to fill in network gaps. Freeing up the road space would allow goods delivery and servicing operations to run more efficiently around the clock as it fits into the major city.

As Greater Parramatta transforms to become the Central River City, there will be changes to the function of streets, bring opportunities to create more places for people, support civic spaces and reinforce movement corridors.

The **Movement and Place Framework** provides a cohesive approach to balancing the movement of people and goods with the amenity and quality of places, contributing to the attractiveness, sustainability and success of cities and towns in NSW. The concept aims to improve the liveability of places through an integrated land use and transport planning tool, that sets customer focused outcomes and delivers wider benefits for the health and wellbeing of the community. The framework has informed the directions outlined in this ITP.

Mode Share Targets

A set of mode share targets were developed in the *Parramatta CBD Strategy Transport Study,* that transition along with the planned intensification of the Parramatta CBD and transport response and interventions. One of the key mode share targets outlined is to decrease journey to work car mode share to 40% by 2036 under the full Planning Proposal.

Strategic level modelling indicates that future land use and transport changes will result in a general trend of re-moding of travel away from the car. To achieve 40% work car mode share by 2036, significant re-moding of travel is required to shift car trips to public transport, and an active mode connectivity.

Observations that were made from the STM sensitivity testing of transport demands in the Planning Proposal area in 2036 showed that if the full Planning Proposal were to occur, the walking and cycling usage would increase to 4.7 times 2016 levels and public transport usage to 3.8 times 2016 levels by 2036.

The implication of this level of demand increase due to walking/cycling and public transport demands would likely take space currently used for road traffic, resulting in a reduction in road capacity and increased congestion. Assuming a 20% drop in car demand, public transport demands would be required to be 4.5 times 2016 levels by 2036 to accommodate for demand. Walking/cycling demands would remain at 4.7 times 2016 levels.

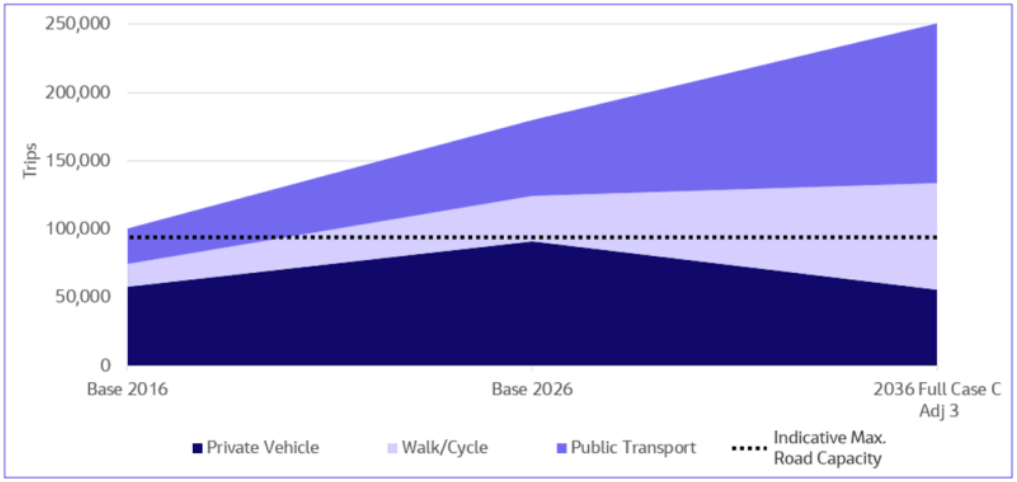


Figure 2: Mode share shift observed for 2036 Full Case C – Adjustment 3.

These observations demonstrate the need for public transport and walking/cycling improvements within Parramatta to cater for the increased demands as the population shifts away from car mode share as the dominant transport mode. A reduction in the role of the private vehicle, increased uptake of sustainable transport, and optimised use of space will be necessary to avoid complete saturation of the road network under future conditions.

Existing Situation and Future Direction

Mode	Existing Situation	Future Direction
Travel Demand Management	Existing Travel Demand Management strategies within Parramatta include: ▪ **Green Travel Plans:** Council requires Green Travel Plans for selected developments in the existing LEP. It also has a Green Travel Plan for its own operations. ▪ **Cycling Education Programs:** Council undertakes limited cycling education programs, which aims to encourage people of Parramatta to use cycling as a means of transport. ▪ **Parramatta Light Rail Construction:** The Sydney Coordination Office is expected to use Travel Choices during the Parramatta Light Rail construction phase. ▪ **Parramatta Shuttle Bus:** The Parramatta Shuttle Bus (Route 900 Loop) is a fast, free transport solution run by TfNSW that connects tourists, residents and commuters to landmarks of the city.	Five recommended TDM strategies for implementation in a growing central business such as Parramatta have been outlined: ▪ **Establish a Transport Management Delivery Agency** – this can be delivered by local government, state government and/or a community organisation. ▪ **Commute Trip Reduction Programs** – programs give commuters resources and incentives to reduce their car trips. Commute trip reduction programs typically include some combination of commuter financial incentive, public transit encouragement and financial support, parking management, rideshare matching cycle facility improvements, information and encouragement. ▪ **Freight Transport Management** – includes various strategies for increasing the efficiency of freight transport. ▪ **Transit-Orientated Development** – refers to residential and commercial centres designed to maximise access by active and public transport, and features that encourage use of these modes. ▪ **Efficient Parking Management** –includes various strategies that encourage more efficient use of parking facilities. As a travel demand management strategy, parking management should emphasize strategies which reduce total vehicle travel.
Walking and Cycling	Existing walking and cycling patterns within Parramatta: ▪ Active transport only accounts for 4% of all JTW trips by Parramatta CBD workers, and 8% of those starting within the Parramatta–Rosehill SA2 ▪ Of all the trips within the LGA, 15% are by walking, and within the CBD, just over 10% of residents walk to their place of employment. By comparison, almost half of all trips in the City of Sydney, and a quarter in the City of Melbourne are by foot. Barriers identified which may be contributing to low cycling mode share include: ▪ There are a limited number of streets with dedicated bicycle infrastructure, resulting in a lack of safety. ▪ There are limited cycling opportunities and permeability in the CBD, negatively impact on cycling participation ▪ Many bike lanes end at intersections, reducing accessibility ▪ The topography north of Parramatta River is challenging for cyclists, especially with limited dedicated infrastructure in the area ▪ There is currently limited bicycle parking available within Parramatta CBD.	The *Parramatta CBD Strategic Transport Study* identified several strategies to improve walking and cycling: ▪ Promote cycling as a means of accessing the CBD, ▪ Improve the walking experience in order to help achieve a mind shift towards walking in the city, ▪ Promote active transport trips within a 10km radius of the CBD In the *Parramatta CBD Pedestrian Strategy,* five actions were prioritised that will potentially have the greatest impact on pedestrian amenity, priority and safety in the CBD: ▪ Implementation of a 40km/hr speed zone throughout CBD ▪ An audit of all footpaths and upgrade or provide new infrastructure accessible by all users ▪ Application of movement and place functions to the CBD with consideration of all transport modes ▪ Amendment to DCP to permeable city blocks, active street frontages and provision for pedestrian infrastructure ▪ Require developers to prepare Green Travel Plans with clear pedestrian objectives and actions Key actions that would be utilised and will be needed to support the CBD Planning Proposal include: ▪ Completing the river foreshore paths on the northern and southern banks, ▪ A north-south physically separated bike path aligned with Marsden Street, Marist Place and Villiers Street, ▪ An east-west physically separated bike path along George Street. ▪ Civic Link: a shared pedestrian cyclist spine from the river to Parramatta interchange The potential increase in cycling trips will need to be accommodated by appropriate bicycle parking provisions.
Trains	Train currently accommodates **30% of JTW trips** by local residents in Parramatta.	Without increased rail capacity and services to address long term increases in demand, rail customers will shift to other car-dependent modes of transport, which would impact on other road users and increase congestion on the

Mode	Existing Situation	Future Direction
	Parramatta CBD is serviced by Parramatta Station, the fourth busiest train station in Sydney with over 90,000 customer movements on a typical weekday. The station is serviced by trains on the: ▪ T1 Western line ▪ T2 Inner West line ▪ T5 Cumberland line ▪ Blue Mountains line The station is also serviced by regional trains to the Central West and Broken Hill.	local and State road network. Reduced rail accessibility and increased car dependency and congestion could lead to decreased urban amenity and land devaluation in the CBD. Better train services with increased capacity and frequency on the T5 Cumberland Railway line will be needed. Committed projects include: ▪ **Sydney Metro West** is a metro rail service to be provided mostly underground. The proposed stations at Parramatta, as well as Sydney Olympic Park, the Bays Precinct, Pyrmont and Sydney CBD (Hunter Street) will provide improved connections between Central River City and Eastern Harbour City, doubling rail capacity between these two areas. Future initiatives for consideration include: ▪ **Parramatta to Epping** high capacity train/mass transit links ▪ **Parramatta to Kogarah** high capacity train/mass transit links ▪ **Parramatta to Norwest** mass transit/train link ▪ **East-West Rail Link** between Greater Parramatta and Aerotropolis
Light Rail	Light rail services do not currently exist in the Parramatta CBD; however, construction of a Parramatta Light Rail (PLR) has begun, with services scheduled to start in 2023.	The Parramatta CBD Planning Proposal will significantly increase the demand for trips to the Parramatta CBD from the Greater Parramatta area. Therefore, the delivery of Parramatta Light Rail Stage 1 and further expansions is required to ensure the trips are not taken via private vehicles, which contribute to congestion on the local and State road network ▪ **Stage 1 (under construction)** of the light rail will connect Westmead to Carlingford via the Parramatta CBD and Camellia with a two-way track spanning 12 kilometres. It will link with existing public transport options, including train, bus and ferry, to form an integrated network capable of keeping Parramatta's future population moving in a convenient and sustainable way. ▪ **Stage 2**, if undertaken, is expected to connect with other public transport modes, including Sydney Metro West (at Sydney Olympic Park), the existing Parramatta and Olympic Park heavy rail stations and Sydney Ferry services at Rydalmere and Sydney Olympic Park.
Bus	Four different operators provide a total of over 50 bus services in the Parramatta CBD; Sydney Buses, Hillsbus, Transdev and Transit Systems. Transport for NSW (TfNSW) also operates a free shuttle (route number 900) around the CBD. Within the CBD, Parramatta Interchange is where a significant majority of Parramatta's bus services converge. This interchange services approximately 250 bus services in each of the AM and PM peak hours. The current interchange is close to capacity. Some constraints to operations were already observed in the *Parramatta CBD Strategic Transport Study*, including: ▪ Key layover storage areas at Argyle Street and Station Street were at or near capacity	The bus network would need to be restructured accordingly, identifying major corridors to maintain, reinforce or develop. ▪ In the STM work done for this ITP, it is forecast that passenger numbers in all corridors are expected to increase, with largest increases along corridors in the southeast and southwest of Parramatta CBD. There are five bus corridors with greater than 5,000 passengers (total two-way) across the two-hour AM peak period in 2056: North-West Transitway, Parramatta Road, Bridge Street, Pitt Street and Centenary Road. ▪ Based on an analysis of the modelled bus patronage, the following three bus route services are forecast to have the highest increase in patronage due to the planning proposal: M91: Hurstville to Parramatta – travels to/from the Parramatta CBD via Church Street, 907: Bankstown to Parramatta, T80: Liverpool to Parramatta – travels to/from the Parramatta CBD via Argyle Street. Assuming a total capacity of 70 passengers per bus, the above results indicate that these three services would require an extra 20 services (M91), 6 services (907) and 4 services (T80) to cater for the additional bus patronage in 2056.

Mode	Existing Situation	Future Direction
	▪ Passenger waiting areas can become crowded ▪ Bus queues can accumulate as clusters of users arrive at/depart the interchange simultaneously	▪ Within and around Parramatta CBD, there are several pinch points and corridors where growth has been occurring or expected to occur. ▪ Upgrade Parramatta Interchange to ensure a streamlined multi-modal network For the medium term, initiatives for consideration and further testing in Parramatta include: ▪ Some services to use the reopened Darcy Street to alleviate pressure on the existing interchange, although the design of the new street limits bus capacity ▪ Services accessing Parramatta CBD from Smith St – there is some potential to review the network, stopping patterns and termination points with the new Metro West station proposed between Macquarie Street and George Street. ▪ Changes to circulation of general traffic within the CBD to alleviate key congestion points around Parramatta Interchange such as the western approach along Pitt Street and the east on Station Street East / Smith Street. ▪ Improving the dual left turn from Great Western Hwy into Pitt St so buses no longer need to use the bus jump start and would receive more green time.
Ferry	Ferry services accommodate less than 1% of the current mode share for employees accessing the Parramatta CBD. The low mode share can be caused by various factors including: ▪ **Slow journey times** - the full-length ferry journey between Circular Quay and Parramatta is 75 to 90 minutes compared with 40 minutes by train and 40 minutes by car ▪ **Infrequent services** - services operate hourly even in peak periods. ▪ **Perceived unreliability** - services to/from Parramatta are affected by low tides. Passengers must consult a Transport for NSW calendar when this occurs, as replacement buses run between Parramatta and Rydalmere.	Whilst ferry services do not represent a large proportion of trips in and out of Parramatta, there are aspirations to continue improving its accessibility and efficiency to attract future customers. ▪ Following the recent upgrade of Parramatta Wharf in 2019, the transformation of Parramatta Quay is underway, with the start of construction on the Escarpment Boardwalk and new plans to redevelop Charles Street Square. These projects will improve equitable access to the ferry terminal. ▪ Transport for NSW plans to modernise the ferry fleet, developing a new style ferry for the Parramatta River. These proposals will make ferry services more accessible, efficient and attractive and may result in some increased patronage at Parramatta. ▪ Improvements for ferry services including later and express services, as well as faster, lighter vessels offering more frequent service could attract future customers. Additional ferry wharves, services by smaller, more frequent vessels would also be beneficial in increasing transport options for residents of new developments in the Parramatta LGA.
Roads	In Parramatta, an extensive road network serves the CBD, links to other precincts and provides regional connections to and from metropolitan Sydney. From the completed projects, Parramatta has already seen a shift in travel behaviours, with the WestConnex M4 Widening significantly improving the reliability of the M4 near Greater Parramatta and access across Sydney from commercial traffic. With the introduction of WestConnex, traffic volumes may decrease along parts of Parramatta Road and other parts of the road network, however they have increased on other key links such as the Great Western Highway due to toll avoidance.	There will continue to be investment in roads with a shift in focus on major roads to provide movement corridors between strategic centres to support key centre to centre journeys. Local roads will move towards providing opportunities for access and connections with the local community and businesses. Utilising movement and place analysis to understand the needs of road links that comprise Parramatta CBD could be key to supporting this shift. Some future road projects that are considered include: ▪ Upgrading key intersections to improve access to Parramatta CBD, including Pitt Street/Marsden Street intersection along Great Western Highway, and the Woodville Road, Parramatta Road and Church Street intersection at Granville ▪ Increase capacity on mass movement corridors such as James Ruse Drive, Victoria Road, Great Western Highway

Mode	Existing Situation	Future Direction
Freight	Parramatta is located near national key freight routes, including the M4 Western Motorway and the Main Western Railway Line. Based on the *Sydney Roads Freight Hierarchy Map*, the network can also be defined by three types of freight routes: ▪ **Primary freight routes:** M4 Western Motorway and Cumberland Highway (A28) ▪ **Secondary freight routes:** James Ruse Drive, between Pennant Hills Road and the M4 Western Motorway, and Woodville Road, south of Church Street ▪ **Tertiary freight routes**: Great Western Highway, Parramatta Road, as well as sections of Church Street, Pennant Hills Road, Victoria Road, Pennant Street Within Parramatta CBD, there are currently 46 loading zone spaces that enable businesses and commercial drivers to deliver and receive goods. This number is declining. Even with current capacity their utilisation is high throughout the weekday. Freight vehicles in Parramatta face strong competition for limited road and kerbside space between 9am and 12pm on weekdays. As a result, freight vehicle drivers need to walk longer distances to delivery points and therefore dwell longer in kerbside loading zones, further restricting access.	The Parramatta CBD Planning Proposal includes a directive on integrating land use and transport to ensure that urban structures, building forms, land use locations and development designs provide for the efficient movement of freight. Freight must not negatively impact the core development goals of increasing the amenity of the CBD. Last kilometre freight refers to the last leg of the journey of goods into shops, cafes, restaurants, offices and homes. As Parramatta grows, changes to the way everyone moves into the CBD will occur, including how freight is delivered. Potential directions include: ▪ Exploring methods to quiet out of hours deliveries in the CBD ▪ Investigating opportunities for gathering and using freight data to improve freight efficiency, and ensuring new buildings are equipped to meet the freight requirements for receiving and dispensing goods and services. ▪ Investigate the provision of minimum loading space requirements for new developments ▪ Investigate opportunities for the implementation of Courier Hubs. By establishing a hub, deliveries can be completed on foot, by bicycle or carted. Initiatives for investigation in the next 10 years include the development and implementation of the Last Mile Freight Policy in collaboration with industry to encourage more freight movements in centres to take place outside of normal business hours. Freight and servicing solutions that allow trade vehicles to deliver services to households and businesses in shorter, more direct lines will allow for a productive economy and liveable community. As Parramatta CBD grows, there will be increasing daily challenges and inefficiencies for freight delivery. Therefore, implementation of a last kilometre freight plan, as well as upgrades for freight access to the CBD are crucial for the success of Parramatta.
Private Vehicles and Parking	From analysing the current supply and demand in Parramatta, driving to work and parking in Parramatta is relatively attractive as a JTW option, because: ▪ **High supply:** Parramatta CBD has more than 28,000 parking spaces, equating to roughly one car space for every 1.8 employees in the CBD. The City of Sydney estimates there is just one parking space for every 6 workers in the Sydney CBD. ▪ **Low cost:** Public 'early bird' parking rates are approximately a third less of those in Sydney CBD and have lower applied parking levies.	Council adopted an interim parking rate for Parramatta CBD to address the parking supply issue. This parking rate is based on the City of Sydney LEP parking rate following the parking rates applicable to Category A for Residential, and Category D for Commercial. The full parking rates are detailed in Appendix A. The implementation of the interim policy has been able to restrict the maximum number of parking spaces in Parramatta CBD per development based on the new parking rates. To maximise the effectiveness of efforts to reduce car use in Parramatta, the permanent adoption of the interim Parking rate should be implemented alongside other parking and transport management strategies. As parking becomes more stringent and costly, the transit network supporting Parramatta CBD needs to be prioritised in terms of serviceability and capacity

Applying the Vision

The Parramatta CBD Planning Proposal is supported by transport measures that aim to ensure as population and employment increases, the transport system will keep up and continue to support and service the community efficiently. As shown in the modelling analysis, the growth in trips to/from Parramatta from the LEP cannot be accommodated in private vehicle trips. As users become encouraged to shift away from car mode share to walking/cycling and public transport, the demand increases to these modes will require additional infrastructure and improvements to cater for the demand.

It is important to integrate Parramatta's transport network and provide the appropriate level of transport service for all who want to travel to, from or within Parramatta. This will ensure its growth from the planning proposal is enabled and activated by transport options, rather than constrained by it.

Recommended Action		Timeframe	Responsibility
G1	Council and State Government will coordinate and collaborate on implementation of the ITP and other plans for transport improvements serving Parramatta CBD.	Short	City of Parramatta, TfNSW
G2	Council and the State Government will collaborate to prepare an Access Strategy for the Parramatta CBD.		
TD1	Establish a transport management delivery mechanism for Parramatta CBD to provide institutional support for transport and parking management services contingent upon identification of funding, resourcing, governance and delivery arrangements	Short	TfNSW
WC1	Update requirements in DCP for end of trip facilities and bike parking in all new buildings	Short	City of Parramatta
WC2	Encourage bike share and micro mobility schemes for residents, employees and visitors for short trips		
WC3	Deliver pedestrian prioritisation, safety and amenity measures such as street trees, lighting, additional crossing locations, shared zones and signal priority		City of Parramatta, TfNSW
WC4	Deliver dedicated cycling infrastructure within the Parramatta CBD that connects to the Principal Bicycle Network		
WC5	Prioritise high quality pedestrian infrastructure that aligns with Parramatta Ways and other key walking routes within 2km of CBD		
WC6	Pedestrian modelling of demand in the CBD needs to consider Civic Link, Light Rail and Metro West		TfNSW
WC7	Develop the Principal Bicycle Network to fill existing gaps, focusing on dedicated infrastructure to and within the CBD	Medium	City of Parramatta, TfNSW
WC8	Provide sufficient footpaths to accommodate forecast increased pedestrian movements as density increases		City of Parramatta
WC9	Implement infrastructure that supports, and investigate means to further improve and widen coverage of 40km/h zones within and surrounding the CBD.		
PT1	Address existing and forecast capacity issues along the T1 Western Line and improve service along the T5 Cumberland Line	Short	TfNSW
PT2	Consider the need for, and plan for additional railway stations in the CBD to offer additional travel options from broader areas to the CBD and address future level of demand		
PT3	Investigate feasibility of prioritizing the potential for travel by rail to the CBD from other existing or new demand market include: ▪ Planned growth areas to the east such as the Greater Parramatta to Olympic Peninsula and the Bays Precincts, including via the Sydney Metro West ▪ Western Sydney Airport ▪ North West and South West Growth Centres ▪ Parramatta to Epping mass transit ▪ Parramatta to Kogarah mass transit ▪ Parramatta to Norwest		
PT4	Work with NSW government to investigate the prioritization of on-street public transport services and to investigate new bus layover areas		
PT5	Secure surface and underground corridor protection for future public transport services		

Taking the Vision Forward

The development and actions outlined in this ITP respond to major transport and parking challenges, driven by substantial growth forecast in the residential population and jobs within the Parramatta CBD by 2056. The transport network objectives are designed to protect and enhance the characteristics of Parramatta CBD and build on these as the city continues to grow and develop in the future. Strong transport capacity and connections will be crucial for the success of Parramatta CBD in its role as the Metropolitan Centre for the Central City.

The direction outlined in this ITP supports the Parramatta CBD Planning Proposal, by providing a strategic plan to manage the existing and future sustainable transportation needs of Parramatta CBD. The planned growth on the network can be accommodated by:

- Improvements to the public transport network on high trip corridors
- Delivery of walking and cycling infrastructure to cost-effectively shift trips within 30 minutes of the CBD
- Targeted upgrades of the road network to ensure maximized use of the existing road network
- Application of proven TDM to ensure the most efficient use of resources and road space allocation

Recommended Action		Timeframe	Responsibility
PT6	Improve the coverage, frequency and accessibility of the public transport network	Medium	TfNSW
PT7	Upgrade Parramatta Interchange to ensure a streamlined multi-modal network		
PT8	Improve intermodal transfers by linking up bus, train and light rail services with pedestrian and cycling infrastructure at key points.		
PT9	Include more buses along road corridors that have roads with VC > 1		
PT10	Implement initiatives as indicated in the *Western Sydney Rail Needs Scoping Study* and *Future Transport 2056*, as well as future stages of the Parramatta Light Rail.	Long	TfNSW
RN1	Utilise movement and place analysis to understand the needs of road links that comprise Parramatta CBD	Short	City of Parramatta, TfNSW
RN2	Maintain working mesoscopic and/or microsimulation models of the CBD network for ongoing evaluation and testing of the road network as it evolves		
RN3	Upgrade key intersections to improve access to Parramatta CBD, including key intersections along Great Western Highway, and Woodville Road/Parramatta Road/Church Street	Medium	TfNSW
RN4	Investigate increasing capacity and targeted improvements on key corridors such as James Ruse Drive, Victoria Road and Great Western Highway		
RN5	Undertake periodic optimisation of traffic signals, providing modal priority in line with the M&P aspiration		
RN6	Inform motorist of real time travel information including traffic conditions and travel time to a range of destinations through dynamic signage		
RN7	Implement Local Area Traffic Management measures in the local road networks within and around Parramatta CBD		
FS1	Investigate freight transport management strategies to increase efficiency in and to Parramatta CBD, and the suitability of loading zones for 24-hour freight and logistics	Short	City of Parramatta, TfNSW
FS2	Develop a last kilometre freight plan to identify the actions to ensure last kilometre freight is considered as Parramatta CBD grows and changes		
FS3	Update controls in DCP to ensure new developments within the CBD consider loading/service facilities.		City of Parramatta
PV1	Promote car sharing initiatives	Short	City of Parramatta
PV2	Implement efficient parking management strategies that encourage more efficient use of parking facilities		
PV3	Investigate feasibility of additional park and ride facilities at appropriate existing and future public transport stops and stations outside of CBD with an attractive fare policy		City of Parramatta, TfNSW
PV4	Permanently adopt the parking rates proposed in the ITP, and review public car parking fees, including early bird rates and evening rates		City of Parramatta
PV5	Continue to increase parking space provisions dedicated to electric vehicles and car share schemes	Medium	City of Parramatta

1.0 Introduction

1.1 Background

Parramatta Central Business District (CBD) is one of Australia's leading regions, and an area of strategic importance located at the hub of the 'Central River City'. Currently it performs a key economic, social and cultural role within Greater Sydney. However, as Western Sydney's population continues to grow, the city is experiencing rapid growth as a metropolitan employment centre.

The NSW Government's plan, *Greater Sydney Region Plan – A Metropolis of Three Cities* highlights the need to grow Greater Parramatta as the hub of the 'Central River City'. This will work to rebalance growth and deliver its benefits more equally and equitably to residents across Greater Sydney.

This Integrated Transport Plan (ITP) for Parramatta CBD responds to the Parramatta CBD Planning Proposal, which has been prepared to amend the planning controls for the Parramatta CBD. Changes to the planning framework are needed to grow the Parramatta CBD to realise its full potential. This planned growth will generate significant travel demand to/from Parramatta CBD, placing greater demand on transport infrastructure and services. The planning proposal needs to be supported by a number of studies, including this ITP, which recommends a strategic plan to manage the existing and future sustainable transportation needs of the CBD.

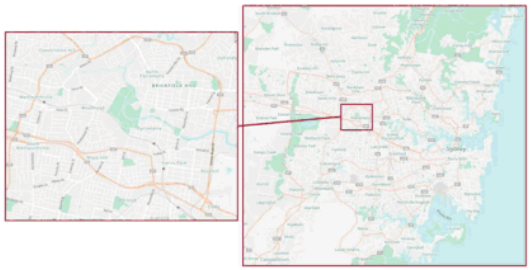


Figure 3: Locality Map of Parramatta

1.2 Vision

The Parramatta CBD Integrated Transport Plan will support the City of Parramatta's broader vision to be Sydney's Central City, sustainable, liveable, and productive – inspired by our communities.

The NSW Government and City of Parramatta (CoP) both share a vision to deliver the Central River City in the *Metropolis of Three Cities* as a place where residents live within 30 minutes of their jobs, education, health facilities, services and great places. Parramatta CBD, located at the hub of the Central River City, plays a central role in Greater Sydney to fulfil this vision.

However, current employment opportunities are concentrated in the east, with more than 250,000 people travelling to work from Central and Western Cities to the Eastern City every day. With this number projected to grow, distance and congestion are limiting accessibility to jobs for many communities, as well as imposing heavy social, economic and environmental costs for those who do commute. By re-balancing as three cities, Greater Sydney aims to broaden its economic footprint to support jobs growth with maximum accessibility, efficiency and productivity. Fundamental to this vision is the Planning Proposal. The Planning Proposal proposes to sharply increase the number of residents and jobs in the CBD profoundly re-shaping the CBD, the Local Government Area (LGA), and Greater Sydney at the metropolitan scale.

The Planning Proposal will result in a significant increase in transport trips starting or ending in Parramatta CBD from just over 51,000 to almost 111,000 in the AM peak alone. Since private vehicle use is currently the preferred mode of travel for commuters, this results in a more congested road network. There is a need to influence and change commuter's mode preferences. A transformation in the city will require a considerable leap in transport planning and delivery to dramatically increase walking, cycling and public transport trips to and from the CBD.

Figure 4: Future Parramatta – Design Excellence Competition Winners (Source: City of Parramatta)

In order to attract and retain businesses and jobs, Parramatta CBD must operate efficiently without reducing liveability and walkability in the CBD. The Planning Proposal supports the delivery of well-integrated developments that sustains a neighbourhood which is easy and comfortable to carry out day to day life. An emphasis on safety, affordable and diverse housing, social cohesion and inclusivity, linked by high quality public and active transport will be needed to ensure community character and attractiveness are not eroded as the CBD population grows.

This vision is already being enabled through strategies and actions implemented by both Local and State Government. However, to ensure the vision is delivered, additional investment and prioritisation is required. A productive, liveable and accessible Central City is a fundamental element to the success of the Greater Sydney region.

1.3 Parramatta CBD Planning Proposal

The Parramatta Local Environmental Plan (PLEP) was gazetted in 2011 setting local environmental planning provisions for land in accordance with the relevant standard environmental planning instrument. In response to the NSW Government's metropolitan strategies and in view of the insufficient capacity of current planning controls to accommodate significant long-term growth in the CBD, City of Parramatta endorsed a draft Planning Proposal for the Parramatta CBD in 2016 that proposes a number of changes to the PLEP.

At a strategic level, the aim of the Planning Proposal is to accommodate an expanded and more intense commercial core supported by higher density mixed use and residential development. Its specific stated objectives are to:

- Strengthen Parramatta's position as the Central CBD for metropolitan Sydney
- Increase the capacity for new jobs and dwellings so as to create a dynamic and diverse city
- Encourage a high quality and activated public domain with good solar access
- Facilitate the provision of community infrastructure to service the growing city
- Strengthen opportunities for the provision of high-quality commercial floor space
- Futureproof the city through efficient and sustainable use of energy and resources.
- To manage risks to life and property from flooding.
- Ensure tall buildings are of an appropriate form for their size and context
- To protect and manage the heritage values of Parramatta's local, State, national and world significant European and Aboriginal heritage items, conservation area, places and views.
- To promote active transport and use of public transport.
- To advocate for regionally significant transport infrastructure to connect residents within 30 minutes to jobs, education and health facilities, services and recreation including the Parramatta light rail and Sydney West Metropolitan rail link.
- To support the provision of regionally significant cultural and public domain infrastructure including the Riverside Theatre, the Museum of Applied Arts and Science, the Civic Link, Parramatta Square and the River foreshore.

The key transport, traffic and parking challenge for the Planning Proposal is for transport and access to support and complement urban intensification of the Parramatta CBD.

Specific issues to be considered include:

- The scale of the transport task required to support the Planning Proposal
- Capacity of existing and proposed public transport services and infrastructure
- Timing of infrastructure and services to support the identified land use mix for the CBD
- Managing transport demand and travel behaviour for the movement of people and goods

The Planning Proposal also contains draft controls to widen some roads as indicated in the draft Land Reservation Acquisition Maps (see Figure 75). These reservations, identified to support potential road, public transport and active transport improvements will be tested through transport modelling. The modelling will assess the benefits and timing of any upgrades, as well as the proposed off-street residential and commercial car parking rates.

For reference, the boundary of the Planning Proposal is shown in Figure 5.

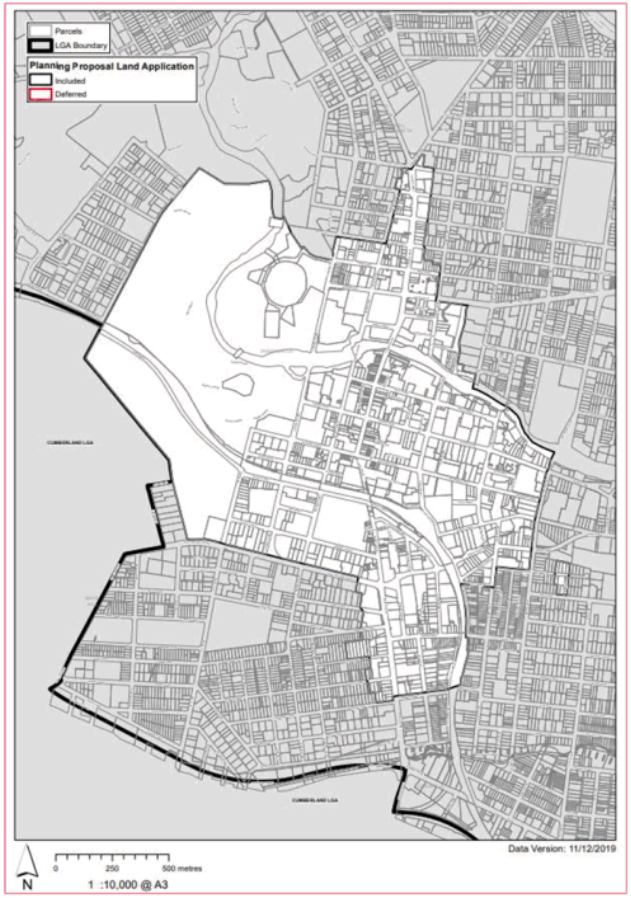


Figure 5: Planning Proposal study area (Source: CoP Planning Proposal)

1.4 Purpose of this report

Jacobs has been engaged by the City of Parramatta to develop the Parramatta CBD Integrated Transport Plan (ITP) which supports and assesses the impact of the Planning Proposal, and identifies the required improvements in road infrastructure, public transport and active transport initiatives that are needed to manage the challenges.

The methodology to assess the Planning Proposal impacts has been to identify the gateways where trips are arriving and departing, and model future outcomes. Old gazetted road widening schemes in the PLEP 2011 are also addressed in this plan to better understand whether these schemes need to be retained. This document is supported by four technical working papers covering more detailed post-analysis of transport modelling outputs, parking strategies, existing situation and future directions, and travel demand management strategies.

1.5 Objectives

This ITP will identify types of intended transport improvements and interventions to a level of detail sufficient for the NSW Government to gazette the proposed amendment in the Parramatta CBD Planning Proposal to PLEP 2011. Changes that, subject to market conditions, will enlarge Parramatta CBD's employment and population over a forecast time. Through the analysis in the ITP, the significant increase in density of both employment and dwellings cannot be supported through a significant increase in private vehicle trips as even with improvements they would not fit on the network. Therefore, the objectives for the ITP are:

Objective 1	Deliver Parramatta Light Rail and Sydney Metro West, and planning for the future transport network
Objective 2	Improve existing train and bus links to extend the 30-minute catchment for transport access to Parramatta CBD
Objective 3	Adopt forward-looking policies, demand responsive services and innovative technologies that deliver transport solutions faster, and/or lower cost
Objective 4	Prioritise delivering walking and cycling improvements and supporting access within a 30-minute walk and ride of the CBD.
Objective 5	Align transport improvements with land use change to maximise the use of new services and sustainable transport mode share among new workers and residents
Objective 6	Identify and deliver targeted improvements to the road network to improve network capacity, and where necessary manage private vehicle trips to maximise the efficiency of the surface road network to support growth.
Objective 7	Leverage transport demand management techniques proven in the Sydney context, to maximise the efficiency of all transport modes in the network.

1.6 Report Structure

This report provides an overview of key factors that affect Parramatta CBD and has been structured as follows:

- **2.0 Strategic Context** – describes the overall land use and transport context for Parramatta CBD.
- **3.0 Parramatta Now** – acknowledges the existing conditions and challenges currently facing Parramatta CBD, and the way in which these challenges are likely to grow in the near future.
- **4.0 Parramatta Future** – identifies the principles that will guide future plans, summarising future transport networks for each mode and the context within which they will operate.
- **5.0 Transport Modelling** - provides an overview of the transport modelling methodology used in the assessment of the project and associated outcomes.
- **6.0 Applying the Vision** – discusses and recommends the transport planning tasks required to ensure Parramatta CBD can respond successfully to the growth identified in the Planning Proposal.

2.0 Strategic Context

The Parramatta Integrated Transport Plan is committed to addressing transport challenges through the development of a clear framework for the future planning and development of the transport system.

2.1 Geographic Context

To frame the existing and future transport function of Parramatta CBD, it is described in the context of three principal geographic settings below.

2.1.1 Greater Sydney

As the Metropolitan Centre within the 'Central River City', Parramatta CBD sits in the demographic and geographic middle of the metropolis of Greater Sydney. Because of this central location, it is in principle, the most accessible location in the entire metropolis. However, in practice, this accessibility depends on the performance of transport linkages, on intensity of the urban development and activities that generate personal and freight travel to and from Parramatta CBD.

Figure 6: Three cities of Greater Sydney (Source: Metropolis of three cities)

For the NSW Government, future land use and transport decision making must maximise the proportion of Greater Sydney residents who can reach the nearest of their metropolitan centres within 30 minutes by public and/or active transport. For Parramatta CBD, the area accessible within this travel time aligns with available train and bus services, extending westward as far as Blacktown LGA and eastward to the Harbour CBD. However, there are still major gaps, particularly towards the north and north-west. By 2056, it is intended that these gaps will be filled, and that anyone living within a 15km radius of Parramatta CBD will be able to get there within half an hour using a sustainable transport option.

2.1.2 Greater Parramatta and the Olympic Peninsula

Greater Parramatta and the Olympic Peninsula (GPOP) refers to a 6,000 hectare area at the core of the Central City, and the centre of Greater Sydney. It spans 13 km east-west from Strathfield to Westmead and 7km north-south from Carlingford to Lidcombe and Granville.

Figure 7: GPOP Pilot Area (Source: GPOP Place-Based Infrastructure Compact (PIC) Pilot)

The vision for GPOP over the next 20 years is for a city and urban hub at Greater Sydney's heart – our true centre: the connected, unifying heart. As one of the fastest growing areas in Greater Sydney, GPOP will continue to be a major generator of new jobs and housing in the future. For GPOP to reach its potential it must become more liveable, productive and sustainable as it grows. The success of GPOP is a critical step in bringing the three cities vision to life.

2.1.3 Parramatta CBD

At the local level, Parramatta CBD can be divided into four precincts: North Precinct, Cultural and Recreational Precinct, Central Precinct and South Precinct. It performs key economic, social and cultural roles, particularly for Western Sydney. Recognised as the heart of the "Central City", there is significant growth and changes expected in the CBD.

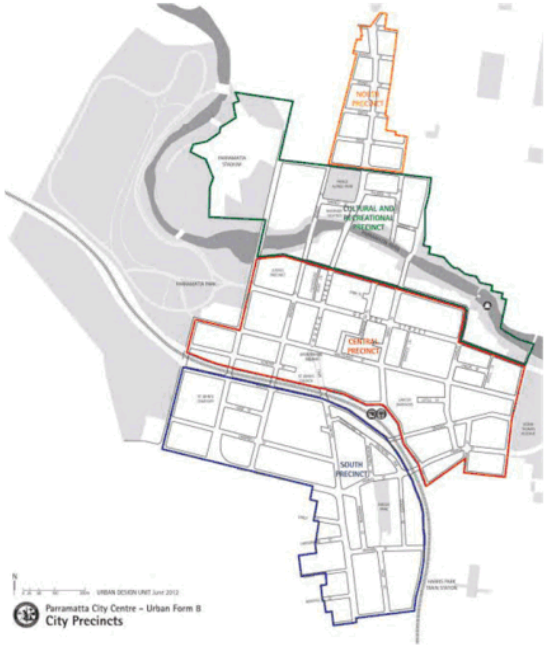


Figure 8: Parramatta City Precincts (Source: City of Parramatta)

2.2 Review of Strategic Plans

The Parramatta ITP aligns with and is supported by several regional, district and local strategic plans including:

- Future Transport Strategy 2056 (2018)
- The Greater Sydney Region Plan: A Metropolis of Three Cities (2018)
- Central City District Plan (2018)
- Greater Parramatta and the Olympic Peninsula Place-based Infrastructure Compact Pilot: A place supported by Infrastructure (2019)
- Central City Rail: Economic Impact Study (2018)
- Western Sydney Rail Needs Scoping Study (2018)
- City of Parramatta Community Strategic Plan (2018)
- City of Parramatta Local Strategic Planning Statement (2020)
- City of Parramatta Community Infrastructure Strategy (2020)
- Parramatta Night City Framework 2020-2024 (2020)
- Socially Sustainable Parramatta Framework (2017)
- Integrated Transport Plan for Parramatta City Centre 2009/10 – 2014/15 (2010)
- Draft Parramatta CBD Planning Proposal (2020)
- Various Council Transport Strategies

These plans and their relationship to the Parramatta ITP are detailed below.

2.2.1 Future Transport Strategy

The *Future Transport Strategy 2056* is a 40-year strategy that guides transport investment to deliver customer mobility for Sydney and regional NSW. It sets out a vision, strategic directions and customer outcomes with a focus on technology and innovation across the transport system to transform the customer experience, improve communities and boost economic performance.

Since the release of *Future Transport 2056* in 2018, TfNSW and land use agencies have been working to further develop Future Transport's 2056 network. The Greater Sydney Network Corridors have been analysed in more detail, with potential transport solutions examined to ascertain the best fit for the city-shaping and city-serving corridors. Indicative 2056 modal networks[1] developed are subject to further investigation and business case analysis, but provide an indication of future network options to inform place planning.

This ITP supports the development of liveable communities such as Parramatta, where transport is vital to mobility as a 'placemaker'. The plan integrates and aligns with long-term priorities for transport that can take advantage of emerging technology. It also recognises the need to build efficiently on Parramatta's existing transport networks, and outlines plans to improve 30-minute access, as well as unlocking capacity by focusing on new transport connections. This would lead to the realisation of wider benefits from investment and encourages a more desirable pattern of development, fulfilling a preferred outcome identified in the strategy.

2.2.2 Metropolis of Three Cities

A Metropolis of Three Cities – The Greater Sydney Region Plan establishes a 40-year strategic land use plan for Sydney. The plan was developed concurrently with *Future Transport Strategy*, aiming to deliver better connections for people across Greater Sydney. The land use vision for Greater Sydney is a metropolis of three cities (Eastern Harbour City, Central River City and Western Parkland City). Consistent with *Future Transport Strategy*, one of the key elements of the plan is the vision of a 30-minute city regardless of location. The goal for this vision is to provide transport infrastructure that allows people to reach their nearest Metropolitan or Strategic Centre within 30 minutes, seven days a week.

Parramatta CBD is identified in the plan as the Metropolitan Centre of the Central River City where enhanced radial transport links and urban renewal will be matched with quality public spaces and infrastructure to attract skilled workers and businesses. The project in conjunction with Sydney Metro West and other projects would therefore complement the Greater Sydney Commission's framework for a liveable, productive and sustainable Central River City.

Potential indicators to deliver the plan that would be relevant to Parramatta and this ITP include:

- Increased 30-minute access to metropolitan centres and clusters,
- Increased use of public resources such as open space and community facilities,
- Efficient transport connections,
- Safe and convenient walking and cycling routes,
- Well-connected jobs and skills,
- A place and city supported by infrastructure.

[1] Future Transport Greater Sydney Network Refinement: https://future.transport.nsw.gov.au/future-transport-strategy/greater-sydney-network/greater-sydney-network-refinement

2.2.3 Central City District Plan

The Central City District Plan is a 20-year plan which guides the implementation of a *Metropolis of Three Cities* 40-year vision at a district level. It seeks to enhance Greater Sydney's liveability, productivity and sustainability into the future. Parramatta sits within the Central District Plan that also encompasses Blacktown, Cumberland and The Hills local government area. As the driver of the Central River City, Parramatta will require significant urban transformation over the next 10-15 years.

The Parramatta ITP is informed by the *Central City District Plan* and aligns with the plan via the following:

- Developing the economy with jobs and skills growth from unprecedented city-scale infrastructure, such as transport infrastructure,
- Establishing transport connections north, south, east and west from Parramatta to optimise Greater Parramatta's location in the centre of Greater Sydney,
- Linking parks, bushland, playgrounds and waterways through the Greater Sydney Green Grid with enhanced opportunities for safe walking and cycling paths.

Key precincts for investment in new homes, jobs, shops, public spaces and places to study that are relevant to this ITP include:

- **Parramatta CBD** – with a significant number of developments in the planning stage, the CBD is adding approximately 200,000 sqm of office space over the next 5 years, equating to over 14,000 additional workers. This includes Parramatta Square, a three-hectare mixed use development including the new Western Sydney University campus, offices, shops and public spaces.
- **Parramatta North Urban Transformation Program** – renewal of the 30-hectare Parramatta North area will create new homes and jobs to support the growth of Parramatta CBD and the Westmead health, education and research precinct

2.2.4 Greater Parramatta and the Olympic Peninsula Place-based Infrastructure Compact Pilot

The *Greater Parramatta and Olympic Peninsula Place-based Infrastructure Compact Pilot* (GPOP PIC) is a strategic planning model that looks holistically at a place to better align growth with the provision of infrastructure.

For GPOP to reach its potential it must become more liveable, productive and sustainable as it grows. Achieving this is only possible if:

- Growth is sequenced in a logical way
- Infrastructure is provided when it is needed
- Great places are created to support the needs of residents, workers and visitors
- Opportunities for all involved in making cities are maximised

This ITP supports the following proposed actions as outlined in the GPOP PIC:

- Proposed Action 1: Focus precincts to align growth with already committed infrastructure, supporting job creation and new development. This includes Parramatta, Westmead and Wentworthville Precincts which support jobs services, tertiary education, housing diversity and creating great cultural experiences.
- Proposed Action 4: Short term infrastructure priorities for GPOP – investigate to support demand across all the 26 precincts.
- Proposed Action 5: Short to medium term infrastructure priorities for Sequencing Plan – Phase 1.

2.2.5 Western Sydney Rail Needs Scoping Study

In late 2015, the Australian and NSW governments announced the joint *Western Sydney Rail Needs Scoping Study* to determine the long-term need, timing and service options for passenger rail to service both Western Sydney and Western Sydney Airport, with an outcomes report published in March 2018 identifying a preferred long-term rail network for Western Sydney.

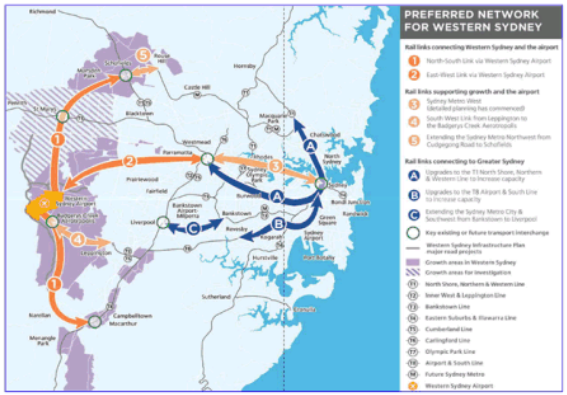
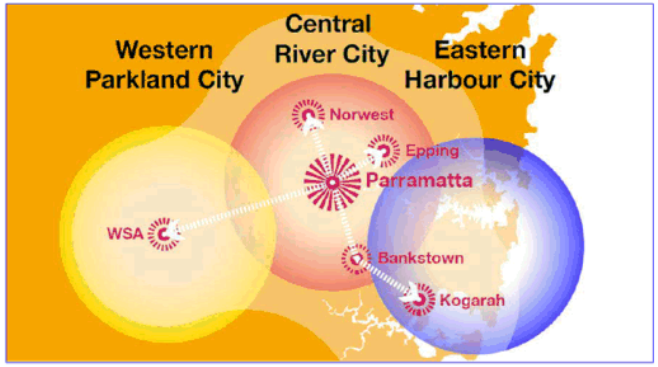


Figure 9: Preferred Network for Western Sydney (Source: Western Sydney Rail Needs Scoping Study)

The Preferred Network outlines the development of a series of rail projects that would create new links within Western Sydney, connect Western Sydney Airport and other parts of the existing rail network. Three of these elements of the preferred network pass through Parramatta and are expected to improve connectivity significantly if implemented.

2.2.6 Central City Rail: Economic Impact Study

The *Central City Rail: Economic Impact Study* was commissioned by the City of Parramatta to better understand the economics of rail infrastructure and what impact new rail will have on the competitiveness of the Central City. The report assesses the four lines that make up the Central City Rail Network: Parramatta to Norwest, Parramatta to Epping, Parramatta to Western Sydney Airport and Parramatta to Kogarah via Bankstown.



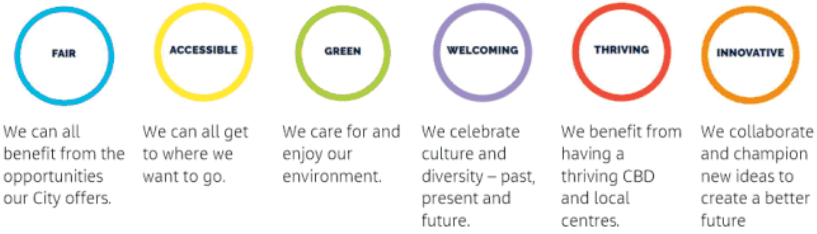
The proposed strategy to deliver the Central City Rail is detailed as follows:

- Drive the Three Cities vision for Sydney's growth and establish the Central River City as a second, connected transport hub for Sydney by providing comprehensive connections to the Eastern Harbour City via the Epping and Kogarah rail corridors as a priority. It will support economic competitiveness and provide opportunities for more rebalanced growth. It will increase the number of places desirable for housing and development.
- Prepare for rail expansion to growth areas in the Western Parkland City and Norwest. Complete planning and preserve corridors and provide immediate mode connections to support initial growth. Capital investment ought to be staged and prioritised to lines that deliver the highest economic return to society. Given the WSA corridor will take longer to develop capital investment ought to be allocated to this line in a staged manner and more funding allocated to corridors where economic need is greatest.
- Undertake a program of development of the rail network. Full integration and completion of all rail corridors and integrate networks extending Sydney Metro West to Western Sydney Airport. The completed network would support the realisation of the vision of Sydney's three successful cities and connect to Newcastle and Wollongong to create a network of five cities.

The program set out will enable Sydney to manage the growth in its Central River City to the benefit of all Sydneysiders. A program of rail investment of this kind will be required to deliver the area's fullest potential and to realise public policy ambitions set out In both the Greater Sydney Region Plan and Future Transport Strategy.

2.2.7 City of Parramatta Community Strategic Plan

The *City of Parramatta Community Strategic Plan* is a 20-year plan which identifies the main priorities and aspirations of the Parramatta community, providing a clear set of strategies to achieve this vision of the future. The plan is built around six key goals: Fair, Accessible, Green, Welcoming, Thriving and Innovative.



This ITP supports the City of Parramatta Community Strategic Plan by delivering the following:

- **Accessible** – The location of jobs and opportunities, the structure of transport networks and congestion all influence the time it takes to travel between places. This ITP sets out increased public transport services and use, as well as walking and cycling improvements to create a better quality of life by reducing the time and stress associated with commuting.
- **Green** – By creating investment in good outdoor environments that promote the use of sustainable transport, the ITP aligns with the community's 'green' vision.
- **Thriving** – By improving links and connections, the ITP ensures major centres within the City of Parramatta have a thriving day and night-time economy.

The intensity of growth and investment in the City of Parramatta will create many opportunities for a new and more diverse mix of high-quality housing, jobs and infrastructure. This means that Council will have an increased capacity to improve the lives of all members of the community and provide more resources to upgrade and expand essential services and facilities.

2.2.8 City of Parramatta Local Strategic Planning Statement

The *City of Parramatta Local Strategic Planning Statement* provides strategic direction on how the City of Parramatta is planning for the next 20 years. The Statement looks at the role of Parramatta as part of Greater Sydney and seeks to achieve a future which is sustainable, liveable and productive. This ITP supports the following key priorities outlined in the statement:

- 1 – Expand Parramatta's economic role as the Central City of Greater Sydney
- 3 - Advocate for improved public transport connectivity to Parramatta CBD from the surrounding district.

- 10 – Improve active walking and cycling infrastructure and access to public and shared transport

2.2.9 City of Parramatta Community Infrastructure Strategy

The *City of Parramatta Community Infrastructure Strategy* identifies and assesses existing community infrastructure in the City of Parramatta LGA. It identifies contemporary challenges Council has for providing quality community infrastructure and key opportunities and direction for the 12 high growth areas. This strategy applies to the unique and diverse neighbourhoods of Parramatta as well as Parramatta CBD. The strategy will be used by the Council to identify priorities for future community infrastructure and guide decision making about planning, funding, delivering and negotiating for community infrastructure

2.2.10 Parramatta Night City Framework 2020 – 2024

The Parramatta Night City Framework, endorsed by Council on 10 February 2020, sets a vision for a future 24-hour CBD with later trading local and strategic centres, particularly Westmead, Epping and Sydney Olympic Park. Transport is a key feature of the Parramatta Night City Framework, due to the integral importance of transport for economic development, place-making, community safety and accessibility. Action 3.1 of the PNCF states to provide connected wayfinding signage that is legible at night, which promotes safe pedestrian routes and follows relevant universal design principles, including to and from Bankwest Stadium. This action is directly relevant to the ITP. Council's advocacy for later running transport services to and from Sydney CBD in Goal 6 of the Framework, as well as point-to-point connection, is also relevant to this ITP.

2.2.11 Socially Sustainable Parramatta Framework

The Socially Sustainable Parramatta Framework (SSPF) identifies specific ways that the opportunities of growth can be shared equitably by everyone in the community. The Framework was endorsed by Council in 2017.

This ITP supports the following key goals in the framework:

- **All people can access a job that enables them to live with dignity and security** – This ITP sets out transport planning strategies to allow more people to have public transport access to Parramatta CBD. This will enable more efficient access to workplaces, services and community facilities.
- **Green, inclusive and safe places to share** – This ITP supports the design, build and maintenance of good outdoor environments and corridors that promote the use of sustainable transport and are safe and inclusive for all.
- **All people can live healthy active lives** - By improving and increasing the walking and cycling links and connections, this ITP supports providing more opportunities for people to be able to live healthy active lives.

2.2.12 Integrated Transport Plan for Parramatta City Centre 2009/10 – 14/15

The previous Parramatta Integrated Transport Plan (ITP) was developed for 2009/10 to 2014/15. The plan identifies the importance of sustainable transport and responds to the need for future strategies to manage road congestion, reduce the reliance on car use, and increase the use of sustainable transport especially for local trips. This plan was developed in 2010 for Parramatta CBD and responds to the Parramatta City Centre Plan (2007) which sets the planning framework for an additional 30,000 jobs and 20,000 residents by 2031. The current ITP is an updated document of the 2010 version, responding to the recent CBD Planning Proposal.

Since the Parramatta ITP was developed, several key elements that support the ITP have been introduced. Council requires Green Travel Plans for selected developments in the existing LEP which encourage developments to support sustainable transport use. Council has also contributed to improving transport efficiency by introducing car sharing, provided by GoGet and adopted guidelines to facilitate expanding car sharing services.

Improvements to walking and cycling amenities within Parramatta CBD have been undertaken, including commencing the implementation of the Pedestrian Amenity Zone, and more cycle routes within the CBD. Continued improvements can be made, particularly regarding cycle parking and increasing walking and cycling facilities.

In terms of public transport, there have been many projects and upgrades to the Parramatta network since the ITP was developed. The Loop free city bus service was introduced in August 2008 and connects key Parramatta destinations. The Opal Card, introduced in 2012 in Greater Sydney, provides an integrated ticketing system which has significantly improved and allowed for an integrated public transport network to be created. Bus stop and bus priority improvements in Parramatta, such as the improvements on Smith Street and Wilde Avenue, have been completed as part of the NSW Government's Bus Priority Infrastructure Program. Committed projects such as Sydney Metro West and Parramatta Light Rail Stage 1 are expected to transform the connectivity of Parramatta and how people travel.

Many improvements for the road network in Parramatta have occurred since the ITP was developed, including along the 'Regional' and 'City' Ring Roads. Secure Taxi Ranks have been introduced and are available along Fitzwilliam Road, between Fire Horse Land and Wentworth Street, in front of City of Parramatta Library.

Recommendations which can to be carried forward for further investigation in this ITP include:

- Support Environmentally Sustainable Vehicles through cheaper parking fees for hybrid vehicles
- Consider appointing an officer to Promote Sustainable Transport and develop policies and manage projects including an annual Sustainable Transport Month
- Develop a Council Travel Plan to show leadership and corporate social responsibility. Consider making Travel Plans a planning requirement for large developments located near good public transport.
- Offer the Walking School Bus program to all primary schools within the LGA.
- Lobby State & Federal Governments to construct the Parramatta to Epping Rail Link, prepare a feasibility study into the Parramatta to Castle Hill Rail Link and restore the Cumberland Line service.
- Lobby for improved Rail Services and Station Facilities including increased collection of performance data, requesting RailCorp to advertise station car park details and market larger ones as Park & Ride. Work with T&I to provide directional signs to all stations.
- Continue to lobby State Government for a Commuter Ferry Service to Parramatta from the Inner West.
- Increase Motorcycle Parking Spaces and Remove On-street Parking Fees.
- Council to instigate the Relocation of Long-Stay Commuter Parking from the City Centre to new multistorey car parks on the city periphery served by the Loop free bus.

2.2.13 Parramatta CBD Planning Proposal

The City of Parramatta has adopted a draft Planning Proposal for the Parramatta CBD which proposes a number of changes to the Parramatta Local Environmental Plan (PLEP). The Planning Proposal is informed by the vision and principles established in the Parramatta CBD Planning Strategy (2015).

The vision in the proposal outlines Parramatta will be Australia's next great city, defined by landmark buildings and high-quality public spaces with strong connections to regional transport. It will respect its heritage, be an exemplar in design excellence, facilitate job growth and ensure its streets are well activated.

The principles as outlined in the Planning Proposal are as follows:

- P1: Achieve world's best practice in the planning and development of cities
- P2: Achieve a strategic balance of land uses
- P3: Create an attractive and distinctive city skyline, defined by tall, slender towers
- P4: Create a liveable, active and highly desirable city
- P5: Promote economic diversity, prosperity and jobs growth
- P6: Improve the quality of urban design and the public domain
- P7: Achieve design excellence
- P8: Celebrate heritage and the natural environment
- P9: Facilitate the delivery of infrastructure to support Parramatta's growth
- P10: Improve access to the regional transport network

At a strategic level, the aim of the Planning Proposal is to produce an expanded and more intense commercial core supported by higher density mixed use and residential development.

The amendments proposed by this Planning Proposal to the current controls in PLEP 2011 include:

- Rezoning of selected land parcels
- A requirement for non-residential floor space in parts of the mixed-use zone
- Increasing the height and floor space ratios permitted on some parcels
- Increase of the height of buildings on some parcels
- A requirement for end of journey facilities for pedestrians and cyclists
- Encouraging high yield employment land uses, high performance buildings and the provision of community infrastructure

This ITP has been undertaken to inform the Parramatta CBD Planning Proposal, setting out a required plan to support the increased growth and employment in the city

2.2.14 Council Transport Strategies

A number of council transport strategies have also informed this ITP. These are outlined in Table 1.

Table 1: Council Transport Strategies

Transport Strategy	Description
Parramatta CBD Strategic Transport Study (2016)	The purpose of the *Parramatta CBD Strategic Transport Study* was to identify the travel patterns and travel demand generated by the future Parramatta CBD, and to develop an understanding of the scale and type of transport interventions required to support the proposed planning control changes within the Parramatta CBD Planning Proposal. It includes three supporting technical papers covering transport modelling outputs, CBD benchmarking, and a review of parking demand, supply and policy in the Parramatta CBD. This ITP builds on information supplied in the study.
Parramatta CBD Pedestrian Strategy (2017)	This strategy aims to guide the City of Parramatta for streets and city areas that are accessible, safe and prioritised for pedestrians. It takes into account the unique character and opportunities in and around Parramatta CBD, to enhance the walking experience and boost liveability. The *Parramatta CBD Pedestrian Strategy* was developed with the aim to provide safe, accessible and simple CBD pedestrian journeys.
Parramatta Ways – Implementing Sydney's Green Grid (2017)	This plan sets out a guide to improve walkability across Parramatta, for not only improving transport but also increasing urban green, recreation and local centre amenity.
Parramatta Bike Plan (2017)	This bike plan has combined comprehensive cycling audit, current population and jobs forecasts, as well as the latest thinking in cycling infrastructure and community input. The plan sets out the proposed cycling network for the next 20 years and beyond for Parramatta, outlining future cycling network plans, education and behaviour change policies.
Parramatta City River Strategy (2015)	This strategy provides a plan for revitalising the foreshore of the Parramatta River between Gasworks Bridge and Rings Bridge, O'Connell Street. It aims to improve connection between the river and the city and create more recreational opportunities for city residents, workers and visitors. The strategy creates a new vision for the area and reclaims the river and its foreshore as a vibrant public space for the city and its people.
City of Parramatta Environmental Sustainability Strategy (2017)	This strategy outlines the City of Parramatta's key environmental sustainability directions and priorities as Parramatta LGA grows, so that all residents, workers and visitors feel the benefits of the growing city, while meeting the bigger goal of building Australia's next great city. Within the *Environmental Sustainability Strategy*, the community identified that transport, getting around and congestion as one of the top three concerns.
Economic Development Strategy (2017-2021)	This high-level four-year plan articulates the direction for economic development in the City of Parramatta LGA. Within the plan, continued improvements to transport and services is recognised as a key component to shaping the City of Parramatta's economic growth.

2.2.15 Additional Strategic Inputs

This ITP supports the Parramatta CBD Planning Proposal by strategically assessing the future transport and land use system through a transport modelling and reporting process. In addition to the strategies outlined previously, the ITP also builds on information supplied by a mesoscopic traffic modelling investigation. A mesoscopic model analyses a transport network at a scale capable of showing the operation of road intersections, and intersection-to-intersection road lengths. TfNSW prepared a mesoscopic model for the Parramatta Light Rail (PLR) Stages 1 and 2 corridors, which will use and have significant operational impacts on parts of the Parramatta CBD street network. The modelling supporting this ITP uses a modified PLR mesoscopic model as a base model refined to help identify the traffic and transport impacts of the Parramatta CBD planning proposal, including the additional floor space resulting from the rezoning, along with identifying and testing potential mitigation measures such as reduced parking provision, or localised road widening and intersection upgrades.

2.2.16 Planning Proposal Boundaries

Since commencing the preparation of the Integrated Transport Plan to support the CBD Planning Proposal, Council has resolved to defer areas from the CBD Planning Proposal Boundary as per Figure 10. The 'red' coloured areas are the areas currently being deferred from the CBD Planning Proposal Boundary. This defers approximately 0.17km^2 of land from selected assessments discussed through this document. It is noted that should these areas be added back into the CBD boundary, this traffic analysis has considered these areas.

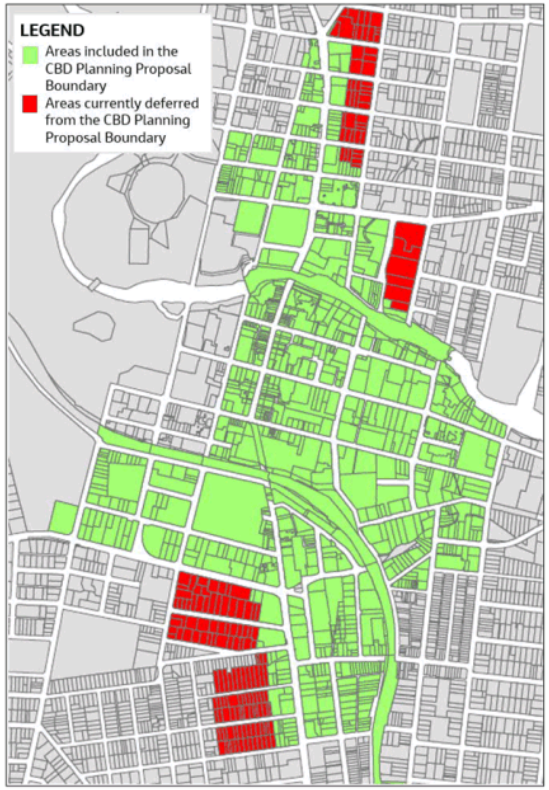


Figure 10: Planning Proposal Boundary Changes

2.2.17 COVID-19

The modelling assessments conducted in this ITP have not considered the potential short and long-term transport impacts of COVID-19, as this has come in after the majority of the project had been completed. It should be noted due to the current situation, the long-term impacts of COVID-19 are unable to be quantified, as of August 2020.

3.0 Parramatta Now

As the Central River City within Greater Sydney, Parramatta is at the centre of a multi-modal transport network. The traffic and transport conditions of Parramatta taken from the Parramatta CBD Strategic Transport Study have been combined with analysis of TfNSW Journey to Work (JTW) and public transport data (Opal) to summarise the existing transport networks for each mode, and the context within which they operate.

3.1 Socio economic and land use context

3.1.1 Greater Parramatta

As indicated from the ABS 2016 census data, the City of Parramatta Local Government Area (LGA) is one of few across Sydney that has a jobs surplus (i.e. more local jobs than workforce), providing employment to workforce residing in many areas around Sydney. As of December 2019, there were an estimated 194,400 jobs in the Parramatta LGA according to the National Institute of Economic and Industry Research, with a resident labour force of approximately 146,000 according to the ABS.

Also, over 25,000 students are currently enrolled across the City's campuses, including Western Sydney University's Parramatta South Campus with 12,500 students and the Western Sydney University Parramatta City Campus with 6,500.

In combination with the retail precincts within the area, this makes Parramatta destination-dominant, serving as an attractor of travel demand. According to Tourism Research Australia, the LGA recorded approximately 252,600 domestic day trips in December 2019 and 113,100 domestic overnight trips.

Different land uses generate varying levels of transport demand and directionality, so a review of existing transport networks is required to provide the context the network operates within. As shown in Figure 11, dominant land use zoning in Greater Parramatta consist of the following:

- Commercial Core (B3) / Mixed Use (B4): comprising the Parramatta CBD.
- Residential (R2, R3, R4): including predominantly medium and high density residential, surrounding the Parramatta CBD and along the rail corridors, whilst outside of these low-density residential dwellings are dominant.
- Industrial (IN1, IN2, IN3): predominantly in Camellia and Rydalmere.
- Infrastructure (SP2): including the Westmead and Rydalmere Health and Education precincts, as well as trunk road and rail corridors.
- Recreation (RE1, RE2): including public recreation immediately to the west at Parramatta Park and private recreation (Rosehill Gardens).

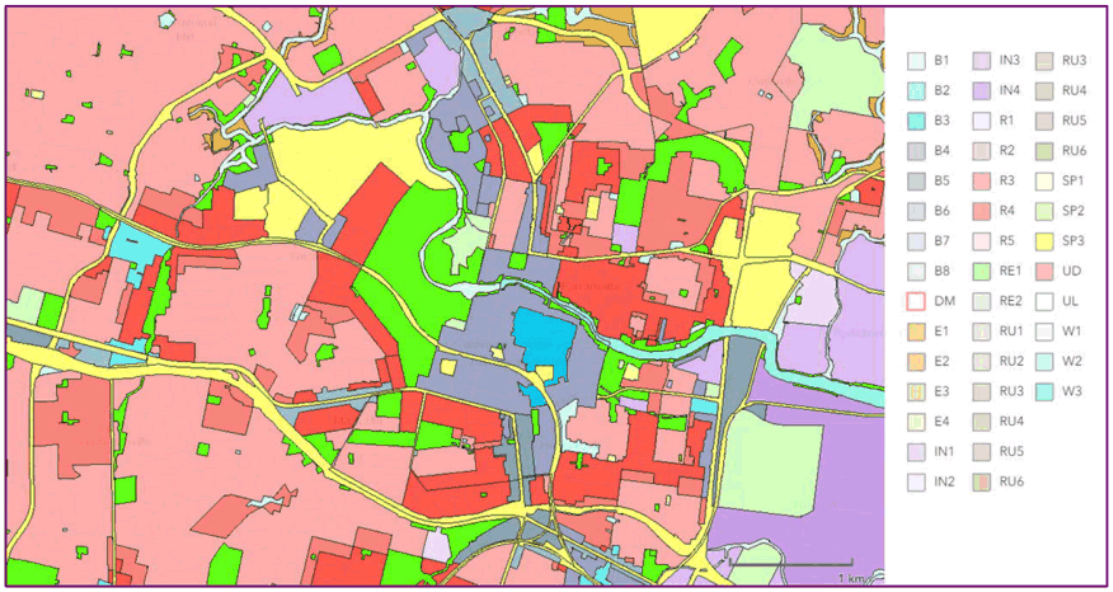


Figure 11: Current land use in Greater Parramatta (Source: NSW Planning Portal)

These land uses typically generate varying levels of transport demand and directionality throughout the day and week, however the AM peak is the focus of this work as it represents the 'peak' demand on a typical weekday. The Parramatta CBD commercial core yields one of Sydney's largest high-density employment centres, in combination with significant retail and civic uses. Commercial and retail land uses typically form the most intensive in travel demand generation, depending on the type of jobs and retail provided. Residential areas serve as trip origins for each of the above, including travel to work, education and shopping.

3.1.2 Parramatta CBD

The Parramatta CBD had a workforce of approximately 55,000, as of 2018/2019, according to the National Institute of Economic and Industry Research. As of January 2020, Parramatta has a total commercial office space of 768,400 sqm (Property Council of Australia), as well as significant retail floor space, such as Westfield Shopping Centre. These provide significant demand generators for Parramatta CBD.

The current land use zoning within Parramatta CBD has been shown in Figure 12. The commercial core (B3) is in the centre of the CBD, predominantly between Parramatta River and the railway line that runs through Parramatta. The Parramatta CBD commercial core yields one of Sydney's largest high-density employment centres, in combination with significant retail and civic uses. Commercial and retail land uses typically form the most intensive travel demand, depending on the type of jobs and retail provided.

A mix of low, medium and high-density residential land use (R2, R3, R4) are found within the northern and southern fringe of the Parramatta CBD precinct. More residential land uses can be found surrounding the Parramatta CBD precinct. Residential areas serve as trip origins for various purposes, including travel to work, education and shopping.

Mixed use (B4, B4PS, B4W) provides a mixture of compatible land uses, integrating business, office, residential, and retail to maximise public transport and encourage active transport modes. These surround the commercial core, making up most of the CBD. Towards the south of Parramatta CBD, there are areas used for business development (B5). These areas enable a mix of business and warehouse uses, and specialised retail premises that require a large floor area.

The Planning Proposal for Parramatta CBD will increase the size and density of the commercial core, continuing to generate demand to the CBD. Additionally, the Planning Proposal aims to create non-residential floor space in mixed use developments on the margins of the CBD that will serve as both trip origin and demand generators, potentially altering the existing travel patterns around the CBD.

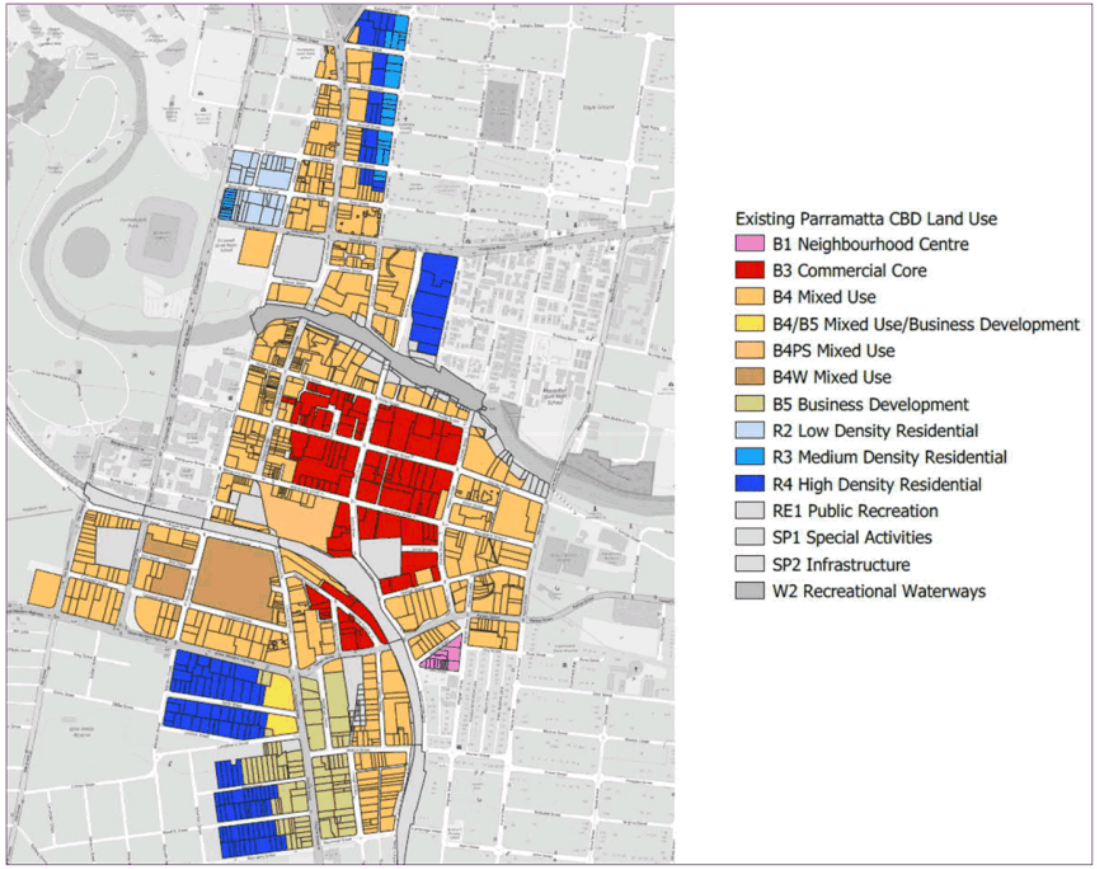
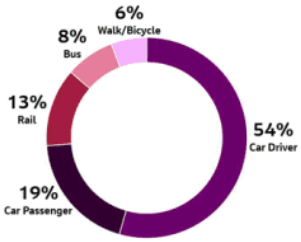


Figure 12: Current land use in Parramatta CBD

3.2 Travel Patterns

When planning transport infrastructure and services, travel behaviour and land use are important factors to consider in order to understand the reasons behind existing travel demands within a region. This includes understanding the trip purpose, as well as the location and intensity of land use that comprises it. It is these features that drives the need for, and type of transport responses.

*In 2016, there were approximately **274,000 daily trips** in and out of Parramatta CBD. This includes trips from various modes, trip types, origins and destinations.*



Mode share data indicates that private vehicle remains the predominant means of people travelling to and from Parramatta CBD, comprising of approximately three quarters of daily trips. In comparison, public transport comprises only 21% of trips, while walking and cycling comprise 6% of total daily trips. 71% of dwellings in the Parramatta-Rosehill Statistical Area 2 (SA2) region own at least 1 or more motor vehicle. Work-related trips are often done in private vehicles, while educational and commute trips have a higher proportion of public transport use.

The Parramatta CBD is a key destination for a variety of trip types. With many local jobs available, the journey to work or commute trip is dominant within the area. As the Parramatta CBD also includes a large amount of commercial and retail land uses, this can create increased travel demand generation for shopping and recreation. Thus, the four key trips in Parramatta CBD are outlined below. The Other category encompasses purposes that do not necessarily fit within the four key trip categories, such as business trips and various personal activities.

Social Recreation	Commute	Serve Passenger (pick-up, drop-off and accompaniment)	Shopping	Other
22%	19%	19%	19%	21%

Varied levels of through movements occur within Parramatta. As Parramatta is centrally located in Greater Sydney, regional east-west bound trips between Sydney and Penrith, and north-south bound trips between Pennant Hills and Liverpool are likely to use the outer ring highways such as Great Western Highway, Western Motorway, and Cumberland Highway to pass Parramatta. For more localised trips, for example from North Parramatta to Granville, trips through Parramatta CBD are more common.

3.2.1 Inbound Trips

Journey To Work (JTW) data on travel patterns and behaviour, derived from the 2016 census data has been used to guide this section. Within Parramatta-Rosehill (SA2) there are approx. 50,200 employees in the area, with an average commute distance of 19.05km. As shown in Figure 13, private vehicle is the most common mode of transport to arrive to work, accounting for 49% of trips, followed by public transport. Only 4% of employees used active transport to commute to work.

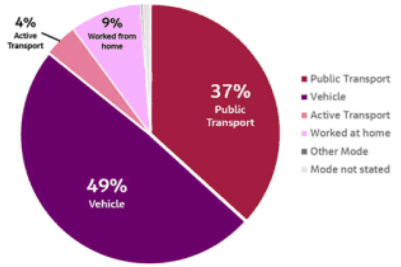


Figure 13: Journey to Work mode choice to arrive to work in Parramatta – Rosehill SA2

A summary of JTW trip origins to Parramatta-Rosehill SA2 is shown in Figure 14.

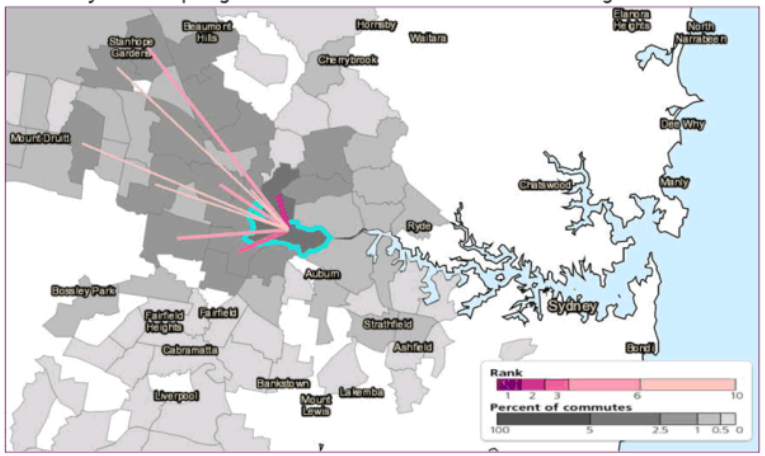


Figure 14: Summary of persons commuting to Parramatta – Rosehill SA2 (Source: ABS Census Data)

Of the commuters, approximately 4.4% live within Parramatta-Rosehill SA2. The second most common region is North Parramatta with 2.9%, followed by regions including Northmead, Lalor Park, Seven Hills – Toongabbie and Greystanes – Pemulwuy.

Several key messages regarding mode choice and trip origins are outlined:

- The dispersed nature of work origins underlines the strategic importance of the Parramatta CBD and its place as a major employment centre.
- The top destinations of workers commute to Parramatta CBD from the west. This reinforces Parramatta's importance within Western Sydney and it's centralised location as the 'Central River City'.
- A high proportion of inbound trips originate from the suburbs directly surrounding Parramatta CBD.
- Public transport is currently the main transport mode for trips from areas located along the rail line particularly in the east, south and west. However, only a low proportion of trips to Parramatta CBD originate from these areas.
- Private vehicles are mainly used for areas without clear access to train services, as well as regions located in the vicinity of the Parramatta CBD. With private vehicle accounting for 49% of trips, this strains the road network and creates congestion as well as places demands on available long-term parking.

3.2.2 Outbound Trips

For residents of Parramatta-Rosehill (SA2), there are approximately 14,400 employed people living in the region; this is equivalent to less than 30% of JTW trip destinations to Parramatta CBD. The average commuting distance for these employed residents is 15km. As shown in Figure 15, 45% of residents took public transport, 38% took private vehicle and 8% used walking and cycling to travel to work.

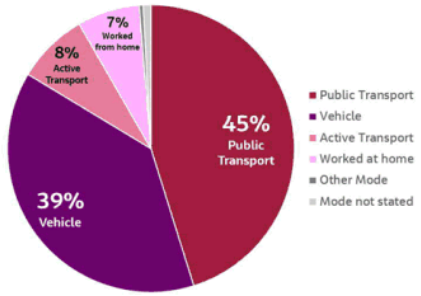


Figure 15: Journey to Work mode choice to travel to work from Parramatta-Rosehill SA2.

A summary of destinations of persons commuting from Parramatta-Rosehill (SA2) is displayed in Figure 16. As shown, the highest proportion of work trips from Parramatta-Rosehill (SA2) were to Sydney CBD, followed by North Sydney.

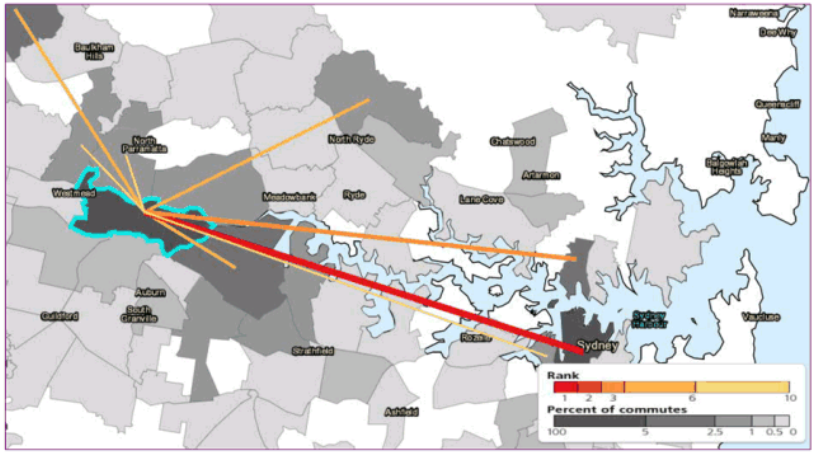


Figure 16: Summary of persons commuting from Parramatta – Rosehill SA2 (Source: ABS Census Data)

The following key trends regarding mode choice and trip destination were observed:

- A large proportion of trip destinations are to the Parramatta CBD itself (15.2%) and regions directly surrounding the CBD, such as Homebush Bay – Silverwater (3.2%), Ermington-Rydalmere (1.4%), North Parramatta (1.7%) and Northmead (1.5%).
- A higher proportion of trips are made to the east, which is consistent with the location of the main employment centres such as Sydney CBD (17.6%), North Sydney (3.8%) and Macquarie Park (2.4%).
- There is a strong dependence on cars for the majority of trips except for the Sydney CBD, the eastern suburbs and the south where commuters tend to prefer public transport. Private vehicles are forecast to remain the main transport mode for areas directly surrounding the Parramatta CBD.
- This highlights car ownership for Parramatta CBD residents and their car-dependence particularly for shorter distance trips. Considering the relative residential growth expected for Parramatta CBD, parking supply policies should be used in aiding the reduction of traffic within and around the Parramatta road network.

3.3 Travel Demand Management

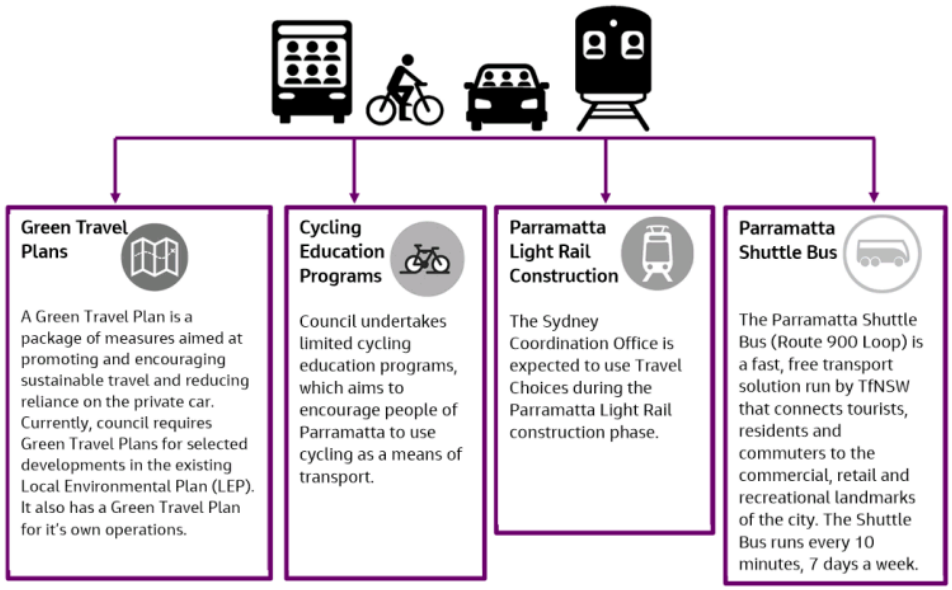
Travel Demand Management is a term used to describe strategies to influence demand on transport networks. This is achieved through redistribution of journeys to other modes, routes, times or minimizing the number of journeys made to improve network efficiency.

Parramatta CBD is already the major employment, retail and commercial centre for Western Sydney. Commercial centres, by definition, are places where many people and activities occur close together, so space is always scarce and valuable. Because cars are space-intensive, requiring more space for travel and parking than non-car modes, a city's liveability and economic productivity depend on limiting car use to what roads and parking facilities can efficiently accommodate.

Within Greater Parramatta, growth in travel demand within a context of constrained network capacity leads to congestion and a reduction in the quality of service to customers. This can be seen in:

- High car mode share (over 65%) for intra-regional work trips.
- Slower travel times and worsening reliability arterial roads and motorways such as the M4 Silverwater Road, Great Western Highway, Victoria Road, Cumberland Highway, James Ruse Drive.
- Peak hour travel times to the Parramatta city centre from within 15 kilometres are likely to increase by up to 10 minutes.
- Congestion on the rail system (e.g. Western Line) and at major transit interchanges (i.e. at Parramatta Bus-Rail Interchange).
- Buses on corridors approaching Parramatta often travel slowly in mixed traffic – reducing service reliability.
- Transport infrastructure (such as the Cumberland Rail Lines and parts of the T-way network) has significant spare capacity and as such is not delivering services as efficiently as possible.
- Conflicts caused by higher priority passenger rail operations in the metropolitan network as opposed to freight operations, and operational limitations set for freight trains.

Travel Demand Management strategies in Parramatta



3.4 Walking and Cycling

Active transport options are appealing to commuters who wish to increase their journey time reliability, reduce their environmental footprint, improve health and avoid congestion.

Parramatta is reasonably flat and has natural features such as Parramatta River and Parramatta Park, lending itself to high amenity active transport options. Despite this, active transport only accounts for 4% of all JTW trips by Parramatta CBD workers, and 8% of those starting within the Parramatta–Rosehill SA2.

3.4.1 Pedestrians

The Parramatta CBD includes basic pedestrian facilities such as paved footpaths, kerb ramps, tactile pavers and signalised crossings. Pedestrians have priority at selected scramble signalised intersections, at times with longer movement times than vehicles. Dedicated pedestrian and cyclist bridges are also provided across the Parramatta River at Elizabeth Street and within Parramatta Park. The amenity for pedestrians in the CBD varies significantly with high quality open pedestrian spaces provided around areas such as Parramatta Town Hall and along Parramatta River, whilst other areas may include older, aged footpaths.

The *Parramatta CBD Pedestrian Strategy (2017)* reports that the current "peak hour" for pedestrians in the city is in the middle of the day with a total of just over 80,000 movements. Figure 17 shows the peak hour pedestrian volumes by street within the CBD area. As shown, the principal set of pedestrian streets within the CBD include Church Street, George Street and Macquarie Street. Along the intersection of George Street and Church Street, the intersection experiences approximately 1200 pedestrian crossings in the peak of 12:30-13:30. They connect major transport, employment, recreational, cultural, service and retail destinations. Areas located near the Parramatta Interchange on Darcy Street also experience high pedestrian traffic, reaching over 2000 pedestrians in the peak hour.

Of all the trips within the local government area, 15% are by walking, and within the CBD, just over 10% of residents walk to their place of employment. By comparison, almost half of all trips in the City of Sydney, and a quarter in the City of Melbourne are by foot. Contextually, both City of Sydney and City of Melbourne have higher densities with greater concentration of attractions within walking distances. For Parramatta, these would be achievable in the medium and long-term, and should serve as targets for development plans to support greater walkability.

The *Integrated Transport Plan for Parramatta City Centre* (2010) supported the "creation of a pedestrian friendly city". A key recommendation of the Plan was the implementation of a Pedestrian Amenity Zone across the CBD that included the reduction of the vehicle speed limit to 40 km/hr for the entire CBD, in addition to new or improved pedestrian facilities throughout and outside the CBD areas, encompassing signals, crossings and access paths to support greater pedestrian mobility. Some of the recommendations remain outstanding, however the designation of 40 km/hr CBD speed limits has been implemented, as well as progress had been made on missing pedestrian legs at intersections and the introduction of scramble crossings.

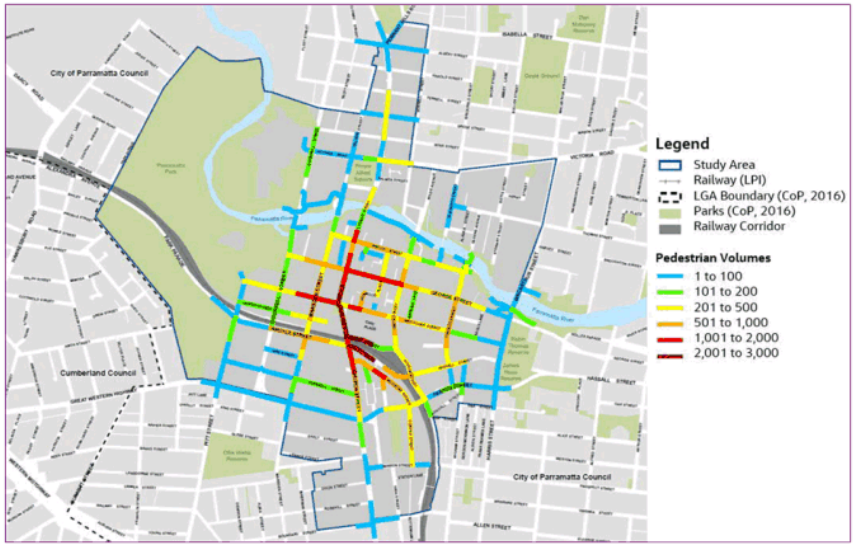


Figure 17: Current (2016) pedestrian volumes– Thursday PM Peak 12:30 - 13:30 (Source: CBD Pedestrian Strategy)
Note: Pedestrian count surveys, March to April 2016, Matrix

3.4.2 Cyclists

Parramatta's existing cycling network provides connections to the CBD from most directions but there are no separated cycling facilities within the CBD. Existing routes incorporate a combination of primarily on-road (mixed traffic) and shared paths with pedestrians. Regional routes are provided from the east to west along the River Foreshore and alongside the M4, however the network lacks direct north-south connections. Existing and proposed cycle paths in proximity to Parramatta are presented in Figure 18. Some of these routes will be and are currently being impacted by Parramatta Light Rail.

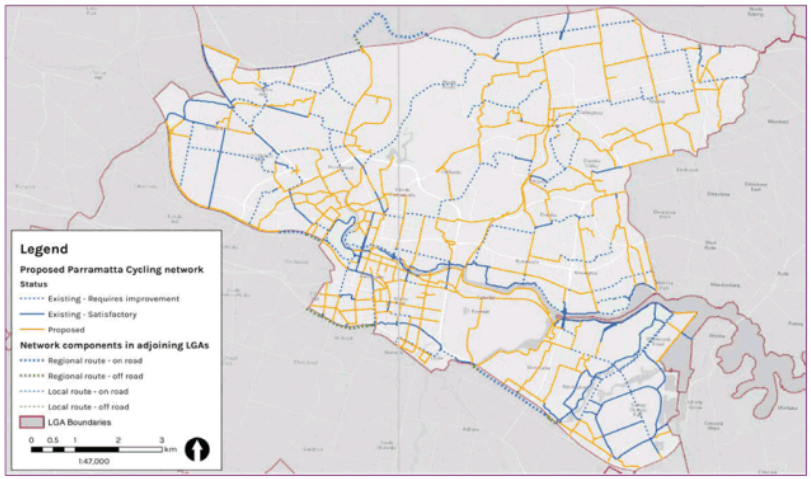


Figure 18: Existing and Proposed Parramatta Cycling Network (Source: Parramatta Bike Plan)

Some key routes within this area include:

- Existing on road routes include George Street, Phillip Street, and parts of Charles Street, Marsden Street and Hassall Street.
- Shared paths include Pitt Street and O'Connell Street, and access to the interchange is via Argyle Street and Station Street East.
- Both George Street and Marsden Street are the identified streets for physically separated bicycle paths in the future.

There are also a number of regional routes for cyclists; The M4 cycleway, the T-way from the north-west, and the Parramatta Valley Cycleway (PVC) from the east provide east-west links. From the south, there is the Parramatta-Liverpool Rail Trail and Duck River shared-path.

Figure 19 shows the popular routes for cycling near Parramatta CBD from Strava. The most common route is along Parramatta River, which is in line with the off-road cycle path existing on that route. Church St and O'Connell St are popular routes within the CBD district, also including off-road. The Parramatta River carries a quarter of a million cyclists each year, and has steadily increased over the years as each section of the river path is unlocked.

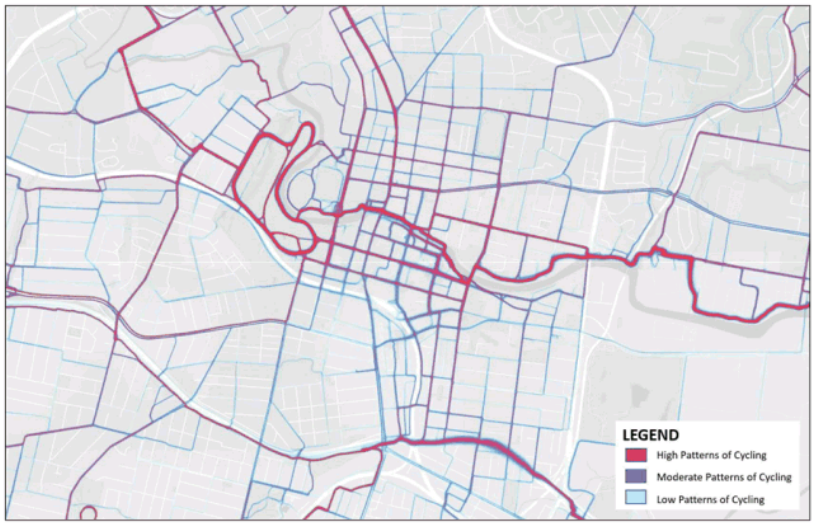


Figure 19: Popular Cycling Routes near Parramatta CBD (Source: Strava)

Secure and convenient bicycle parking at transport interchanges makes it easier to access public transport services on a bike. Parramatta Station has secure access bicycle parking facilities with individual lockers and a bike shed. North of the Parramatta CBD planning proposal area however, there are few safe cycling facilities. The cycle network is disconnected within and on approach to the CBD. Most cycle routes to the north are in an on-road environment with moderate to high difficulty for cyclists, with limited dedicated infrastructure.

Despite the presence of cycling infrastructure within Parramatta, there is still only a small proportion of people using the bicycle as a mode of transport. As mentioned in *Parramatta Bike Plan (2017)*, some of the barriers that may be contributing to this include:

- There are a limited number of streets with dedicated bicycle infrastructure, resulting in a lack of safety.
- There are limited cycling opportunities and permeability in the CBD, negatively impact on cycling participation
- Many bike lanes end at intersections, reducing accessibility
- The topography north of Parramatta River is challenging for cyclists, especially with limited dedicated infrastructure in the area

3.5 Public Transport

Public transport in Parramatta consists of trains, buses and ferry. Whilst public transport within Parramatta CBD is easily accessible, there are challenges that exist regarding multimodal integration and accessibility.

3.5.1 Train

Train forms the spine of the public transport network in Sydney, and this is no different for Parramatta. Train currently accommodates 30% of JTW trips by local residents.

Parramatta CBD is serviced by Parramatta Station, the fourth busiest train station in Sydney with over 90,000 customer movements on a typical weekday. The station is serviced by trains on the T1 Western line, T2 Inner West line, T5 Cumberland line and the Blue Mountains line. The station is also being serviced by regional trains to the Central West and Broken Hill.

Figure 20: Train Lines servicing Parramatta Station (Source: Transport for NSW)

Analysis within the *Parramatta CBD Strategic Transport Study* suggested that in 2016, demand was approaching nominal capacity (in the peak hour, dominant direction) on the critical T1 Western Line and T5 Cumberland Line services. Following signalling and track upgrade works to increase capacity, improve journey times and reliability, a new timetable was introduced in November 2017 to increase the capacity on routes serving Parramatta which included:

- 40% more trains
- Up to 20 express services (a train every three minutes) between Parramatta and Sydney CBD at peak times
- Direct link between the Inner West and Parramatta (T2 Inner West line)

Opal Data captured in September 2019 indicated that on a typical weekday, there were approximately 49,900 train trips[2] taken from Parramatta Station and 51,900 trips were taken to Parramatta Station. The most popular destinations for outbound train trips were to Sydney Inner City (28%), followed by Blacktown (9%) and Strathfield – Burwood – Ashfield regions (7%). The most popular origins for inbound train trips were from Sydney Inner City (28%), followed by Blacktown (8%) and Strathfield – Burwood -Ashfield regions (7%).

Whilst existing improvements have allowed improved services, Parramatta's growth is forecast to trigger a rise in passenger demand up to 2051– by 50 per cent on the T1 and Blue Mountains lines and 80 per cent on the T2 line. This means other measures to increase capacity on routes serving Greater Parramatta are vital.

3.5.2 Light Rail

Light rail services do not currently exist in the Parramatta CBD; however, construction of a Parramatta Light Rail (PLR) has begun, with services scheduled to start in 2023. This is discussed in detail in the Parramatta Future Section.

[2] All Opal Data processed assumed that trips <18 were assumed to have 18 trips in total.

3.5.3 Buses

Buses are a fundamental part of the public transport system in Parramatta. Since new services can be implemented faster and cheaper than other types of public transport, they are able to cover an extensive geographic catchment along key radial corridors from the CBD and beyond. Whilst the majority of JTW trips are made by car and rail, the bus network plays an important role in providing transit accessibility to the CBD and public transport access to the rail network at Parramatta Interchange. Key bus service routes are shown in Figure 21.

Four different operators provide a total of over 50 bus services in the Parramatta CBD; Sydney Buses, Hillsbus, Transdev and Transit Systems. Transport for NSW (TfNSW) also operates a free shuttle (route number 900) around the CBD.

Within the CBD, Parramatta Interchange is where a significant majority of Parramatta's bus services converge. This interchange services approximately 250 bus services in each of the AM and PM peak hours. The current interchange is close to capacity. From September 2019 Opal Data, the most common interchange combination is changing from bus to train at Parramatta Interchange to access Sydney Inner City.

However, some constraints to operations were already observed in the *Parramatta CBD strategy*, including:

- Key layover storage areas at Argyle Street and Station Street were at or near capacity
- Passenger waiting areas can become crowded
- Bus queues can accumulate as clusters of users arrive at/depart the interchange simultaneously

The *Parramatta CBD* transport *strategy* showed that the highest load of bus patronage is generally to the west of Parramatta CBD. Through the study, it identified the strategic importance of Park Parade, the Great Western Highway, Victoria Road and Church Street in terms of providing bus access to the CBD.

Opal data from September 2019 shows that the top bus trips from Parramatta – Rosehill (SA2) occur to destinations within the district (10%), or to neighbouring districts such as North Parramatta (SA2), Northmead, or Wentworthville-Westmead. The top bus trips to Parramatta-Rosehill also occur from origins within the district (12%), or from neighbouring districts such as North Parramatta (8%) or Ermington-Rydalmere (7%).

A high degree of priority infrastructure is available for buses; including two bus transitways (T-ways) to the north west and south west: these corridors also cater for the largest bus passenger volumes accessing the CBD. However, to cater for future bus patronage volumes, more infrastructure will be required to ensure smooth operation of additional services.

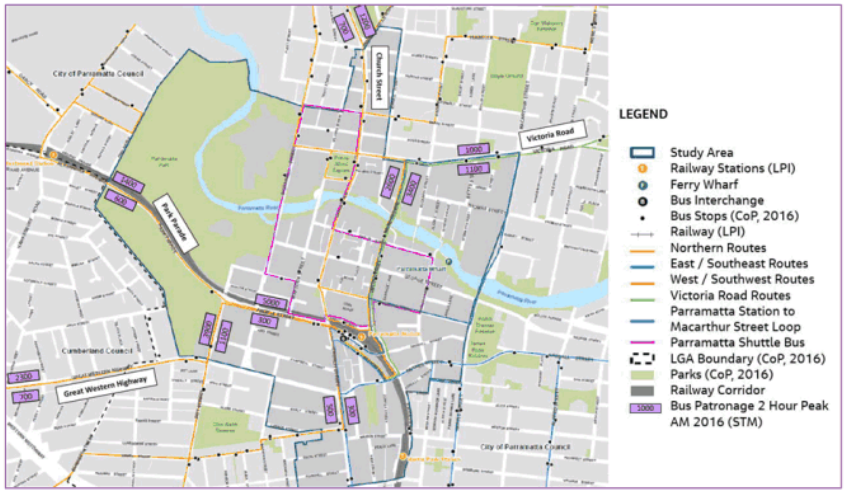


Figure 21: AM peak hour bus demand at key cordon locations (Source: CBD Pedestrian Strategy)

Figure 22: Existing Bus Infrastructure in Parramatta CBD (Source: Google)

3.5.4 Ferry

Parramatta Wharf provides access to the Parramatta CBD by ferry. The wharf is located on the Parramatta River, on the eastern fringe of the CBD. The wharf is serviced by the F3 Parramatta River route which operates from Parramatta to Circular Quay, as shown in Figure 23.

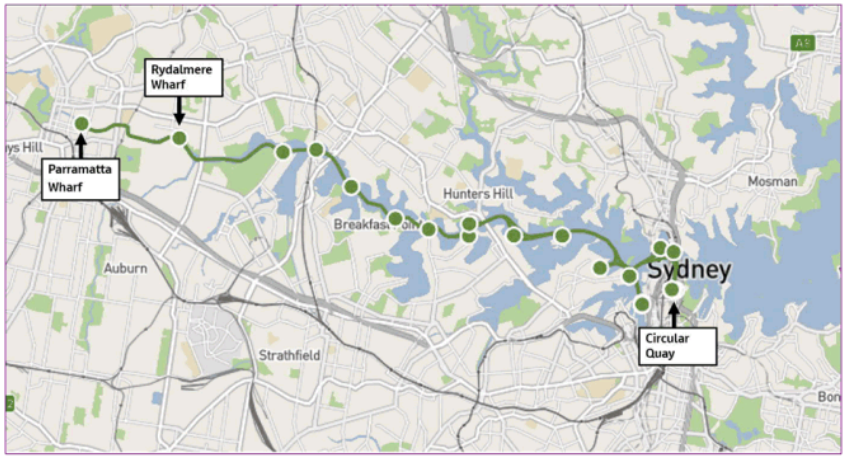


Figure 23: F3 – Parramatta River to Circular Quay Route (Source: Transport NSW)

Ferry services accommodate less than 1% of the current mode share for employees accessing the Parramatta CBD. In analysis conducted in the *Parramatta CBD transport strategy*, average line load data collected for the F3 Parramatta River ferry service illustrates very low patronage at wharves at the western end of the service during peak commuter periods, increasing at the eastern end in proximity to the Sydney CBD, however still remain below 70% seating capacity. Barrier count data shows that passenger movements accessing central Parramatta by ferry have been consistently less than 200 passengers per two-hour (weekday) peak period. This can be caused by various factors including:

- **Slow journey times** - The full length ferry journey between Circular Quay and Parramatta is 75 to 90 minutes compared with 40 minutes by train and 40 minutes by car
- **Infrequent services** - Ferry services operate hourly even in peak periods.
- **Perceived unreliability** - Ferry services to/from Parramatta are affected by low tides. Passengers must consult a Transport for NSW calendar when this occurs, as replacement buses run between Parramatta and Rydalmere.

Despite the above factors, Parramatta River Ferry services are popular with the local community and with Western Sydney more broadly, for the important recreation opportunities they provide, and their increasing contribution to the area's tourism offering. This popularity can be seen during the weekday off-peak and weekend periods, with loadings 400-600% higher experienced during Saturdays, Sundays and holiday periods compared to weekdays.

From Opal Data captured in September 2019, 19 minute trips to Rydalmere Wharf are the most common trip origin and destination for ferry trips to/from Parramatta. These trips are higher on weekends and highlights that commuters do not choose to use the ferry line as a means of travelling for commuting purposes, but rather are more popular for leisure.

In recent years, many improvements have been made to ferry services and infrastructure. In 2017, an additional 90 weekly services were added to Parramatta. The NSW Government also recently completed upgrading the Parramatta Wharf in 2019 as part of the Transport Access Program (TAP). The upgraded wharf provides improved amenity and safety, quicker and more efficient boarding and disembarking, and increased wharf capacity.

With the development of the new Powerhouse Precinct and Parramatta Square fast becoming a jobs hub, the ferry line will play a bigger role in connecting commuters to Sydney's Central River City in coming years. Council is advocating for smaller, low impact vessels, increased ferry speeds and more frequent services between Parramatta and Sydney Olympic Park.

3.6 Roads

Road users include public (buses), private (personal cars and taxis), and freight (LGV and HGV) vehicles. The road network facilitates the majority of the transport mobility task in Greater Sydney. In Parramatta, an extensive road network serves the CBD, links to other precincts and provides regional connections to and from metropolitan Sydney.

3.6.1 Wider Road Network and Road Hierarchy

Greater Parramatta has two designated ring-roads as shown in Figure 24. Parramatta CBD 'City Ring-Road' is on the outskirts of the Parramatta CBD and its function is to facilitate traffic circulation in the CBD. The 'Regional Ring Road' is made up of three key State roads, the M4 in the South, the Cumberland Highway in the West, and James Ruse Drive in the North and East. Its function is to direct regional traffic around the CBD.

Figure 24: Parramatta CBD 'City' and 'Regional' Ring Roads

Characteristics of key roads within Parramatta CBD are shown in Table 2.

Table 2: Key roads around Parramatta CBD

Road	Road Classification	Volume (in peak direction of travel)		Year Data Collected
		AM Peak	PM Peak	
James Ruse Drive	State Road	2,890 (NB)	2,430 (NB)	2014
M4 Western Motorway[3]	Motorway	2,070 (SB)	1,910 (SB)	2015
Cumberland Highway	State Road	2,260 (SB)	2,850 (SB)	2016
Great Western Highway (A44)	State Road	1,620 (EB)	1,880 (WB)	2019
Victoria Road	State Road	1,190 (EB)	1,260 (EB)	2016
Macarthur Street	Regional Road (Parramatta)	990 (SB)	1,100 (SB)	2014
Pennant Hills Road	State Road	900 (SB)	740 (SB)	2019
Old Windsor Road (A40)	State Road	2,550 (SB)	2,420 (NB)	2019

The Great Western Highway / Parramatta Road and the M4 Motorway are the major east-west connections for the Metropolitan Region. These all pass-through Parramatta. As a result, the CBD's road network should manage cross-regional private vehicle and freight trips as well as shorter cross-town and local trips, without jeopardising the quality and function of the CBD. The road network within Parramatta CBD has a well-defined pattern by the railway line and Parramatta River, both of which run east-west. Parramatta Park on the western edge forms a barrier to through westbound movement.

In addition to the Ring Roads, other significant roads that lead to the Parramatta CBD include:

- Great Western Highway from Penrith and Blacktown
- Victoria Road from central Sydney along the north of Parramatta River
- Parramatta Road, Woodville Road and Church Street from the south of Parramatta
- Windsor Road and Church Street from the north of Parramatta and Baulkham Hills

The *Parramatta CBD Transport strategy revealed* that **congestion is experienced at peak periods in locations on the 'inner ring road' network including the Great Western Highway, Pitt Street, Parkes Street, O'Connell Street and Macarthur Street at the Gasworks Bridge.** Operations along key east-west and north-south inner CBD streets, were generally observed to be reasonable. **The 'Regional Ring Road' experiences significant congestion along the M4 Western Motorway, particularly at the Church Street eastbound exit ramp; and at select locations on James Ruse Drive and the A28 Cumberland Highway, particularly at intersections with Old Windsor Road and Windsor Road.**

AM volume to capacity ratios (VCR) on the road network surrounding Parramatta CBD from 2016 are shown in Figure 25. The VCR is a measure of the level of congestion on a road given the traffic volume and road capacity. When the VCR reaches 1, this indicates that the road is operating at 100% capacity. As shown, the majority of roads have a VCR of 0.85 or less. Roads within the Parramatta CBD, particularly along Marsden Street, experiences roads operating near or at 100% capacity.

[3] Data for M4 Western Motorway taken prior to Tollway introduction, near Sydney Olympic Park.

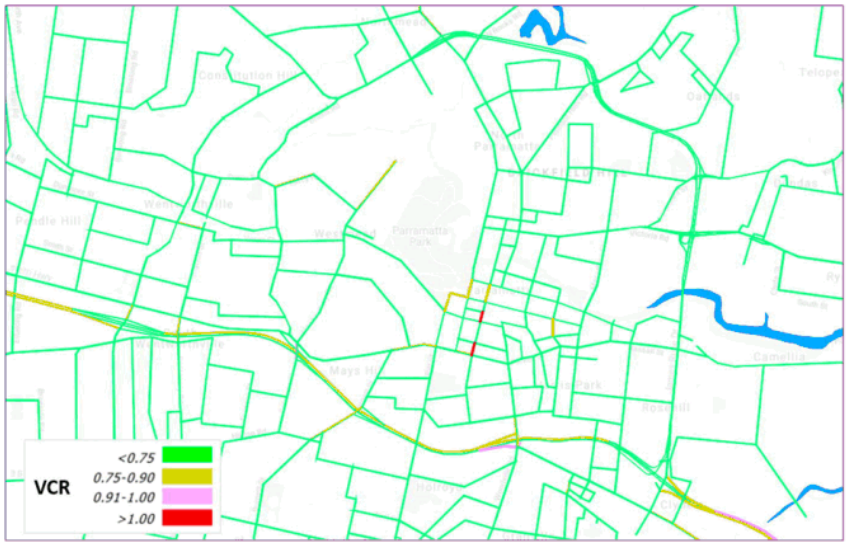


Figure 25: Base Year (2016) AM Peak (7-9am)- Volume to Capacity Ratio (Source: STFM)

Existing AM and PM peak typical travel speeds on the road network surrounding Parramatta CBD are shown in Figure 26 and Figure 27. Travel speeds provide a means of assessing the functional performance of a road network, by providing an aggregate measure of the performance of a route that considers the time to travel the links and the intersections along that route. It gives a good indication of quality of a route relative to alternatives as drivers generally select routes that are faster and minimise their travel times.

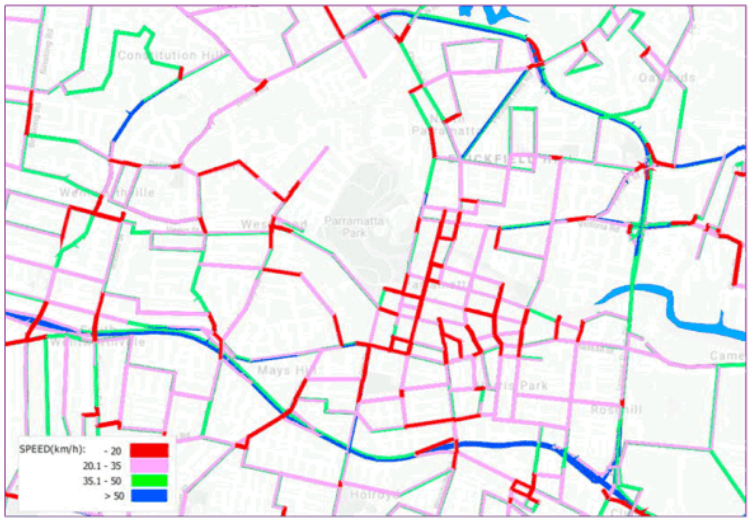


Figure 26: Current (2018) AM Peak (7-9am) – Travel Speeds (Source: STFM)

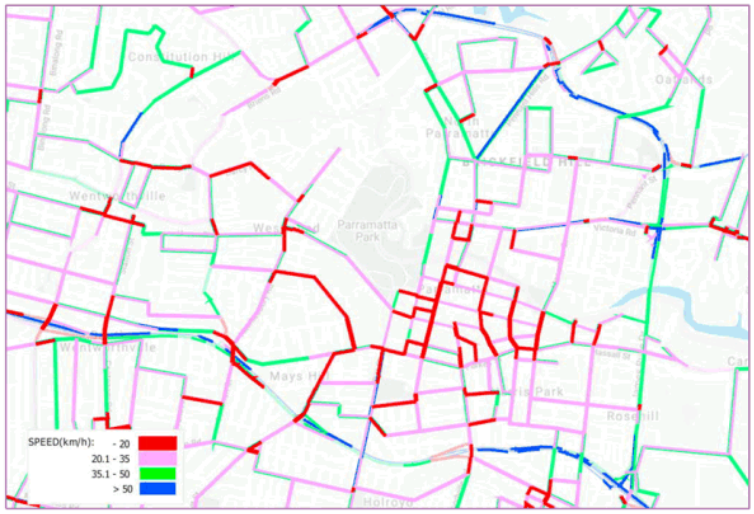


Figure 27: Current (2018) PM Peak (4-6pm) – Travel Speeds (Source: STFM)

Additionally, typical traffic obtained from Google was used to show the traffic congestion hotspots around Parramatta. As shown, during the AM peak congestion is generally observed along Parramatta Road and Woodville Road, near the intersection with Church Street, and along Darcy Road near Westmead Hospital. During the PM peak, congestion is generally observed the intersection of Great Western Highway, Parkes Street and Church Street and along Harris Street and Macarthur Street. Other hotspots include along James Ruse Drive near the intersection with Church Street.

Currently, trips on the road from Parramatta CBD to Sydney CBD take around 40 minutes – 1hr 25 minutes via the M4 toll in the AM peak. A similar trip without tolls takes between 50 minutes - 1 hr 30 mins in the AM peak.

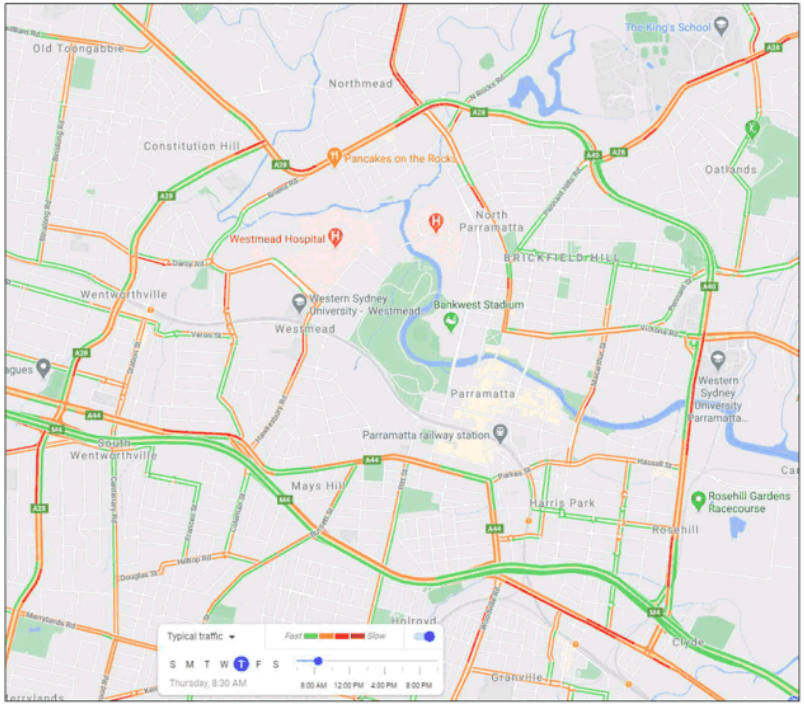


Figure 28: Typical Thursday 8:30am Traffic (Source: Google April 2021)

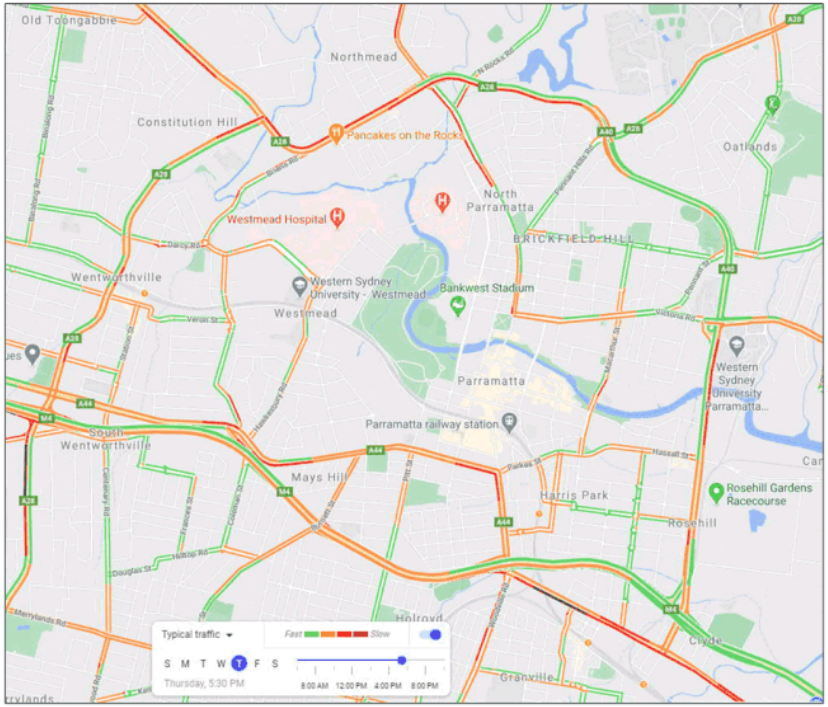


Figure 29: Typical Thursday 5:30pm Traffic (Source: Google April 2021)

3.6.2 Intersection Performance

The performance of a road network is largely dependent on the operating performance of it's intersections which control and determine the capacity and travel speeds in a network.

SIDRA intersection modelling tool was used to aid with the design and evaluation of the key intersections within Parramatta. Stand-alone models of one simple intersection or a set of closely spaced intersections were used to provide a high level of detail including geometries, drive behaviour and signal plans. SIDRA provides estimates of capacity and performance statistics such as delays, queue length etc. by lane for all approaches to an intersection.

The list of intersections assessed, and their associated results are shown in Table 3. The SIDRA modelling shows that the majority of signalised intersections within and surrounding Parramatta are currently operating at capacity or are approaching their nominal capacities during the peak periods.

The following inner-ring intersections currently operate at LoS E or F during the peak periods:

- Parkes St / Harris St
- Great Western Hwy / Marsden St
- Great Western Hwy / O'Connell St

With the exception of Cumberland Highway (Hart Dr) /Old Windsor Road, the majority of outer-ring intersections currently operate at LoS E or F during peak periods. This includes:

- Great Western Hwy/ Cumberland Hwy (Jersey Rd)
- Cumberland Hwy (Hart Dr) / Darcy Rd
- Cumberland Hwy (Hart Dr) / Windsor Rd
- Cumberland Hwy / Pennant Hills Rd / James Ruse Dr
- James Ruse Dr / Hassall St / Grand Ave
- Great Western Hwy / Parramatta Rd / Woodville Rd / Church St

Table 3: 2016 Intersection Performance

Site	Network	Intersection	TCS	95% Queue (m)		Average Delay (sec)		Degree of Saturation (DoS)		Level of Service (LoS)	
				AM	PM	AM	PM	AM	PM	AM	PM
1	1,2	O'Connell St / Victoria Rd	1105	165	105	31	32	0.86	0.92	C	C
2		Victoria Rd / Villiers St / Marist Pl	742	64	81	33	39	0.90	0.92	C	D
3	3	Victoria Rd / Wilde Ave	1055	206	184	40	34	0.83	0.73	D	C
4	4	Victoria Rd / Macarthur St	749	210	166	39	41	0.76	0.69	D	D
5	5	George St / Macarthur St / Harris St	2049	310	367	15	24	0.82	0.85	B	C
6	6,7,8	Parkes St / Harris St	1899	128	144	72	60	0.99	0.92	E	E
7		Parkes St / Wigram St	3818	96	103	33	24	0.90	0.77	C	C
8		Parkes St / Station St E	2203	115	124	32	44	0.92	0.91	C	D
9	9,10, 11,12	Great Western Hwy / Parkes St / Church St	108	184	156	58	59	0.92	0.92	E	E
10		Great Western Hwy / Marsden St	724	170	126	67	55	1.00	0.99	E	E
11		Great Western Hwy / O'Connell St	2291	150	178	49	44	0.99	0.97	D	D
12		Great Western Hwy / Pitt St	156	214	172	45	31	0.91	0.92	D	C
13	13,14	O'Connell St / Macquarie St	1065	199	39	19	14	0.90	0.90	B	B
14		O'Connell St / George St	1094	203	96	54	19	1.00	0.73	D	B
15	15	Church St / Pennant Hills Rd / Albert St	190	398	228	41	33	0.88	0.75	D	C
16	16	Church St / Barney St	1085	303	164	33	40	0.85	0.68	C	D
17	17	Great Western Hwy/ Cumberland Hwy (Jersey Rd)	2693	397	303	84	66	1.00	0.99	F	E
18	18	Cumberland Hwy (Hart Dr) / Darcy Rd	2329	287	313	59	73	0.97	0.99	E	E
19	19	Cumberland Hwy (Hart Dr) / Old Windsor Rd	1852	296	312	36	35	0.81	0.85	D	C
20	20	Cumberland Hwy (James Ruse Dr) / Windsor Rd	704	>500	>500	52	>100	0.96	1.41	D	F
21	21	Cumberland Hwy / Pennant Hills Rd / James Ruse Dr	1026	329	241	56	54	1.00	0.99	E	D
22	22	James Ruse Dr / Hassall St / Grand Ave	1565	>500	>500	61	66	0.97	0.98	E	E
23	23	Great Western Hwy / Parramatta Rd / Woodville Rd / Church St	84	457	450	69	66	1.00	0.99	E	E

3.6.3 Road Safety

The crash data for the Parramatta LGA area obtained from TfNSW has been analysed, which includes a dataset from 2014-2018. In the five-year period from 2014-2018, 3301 casualty crashes were recorded in the Parramatta LGA. A summary of the total crashes in shown in Figure 30. Figure 31 shows the types of crashes over the past 5 years in Parramatta LGA.

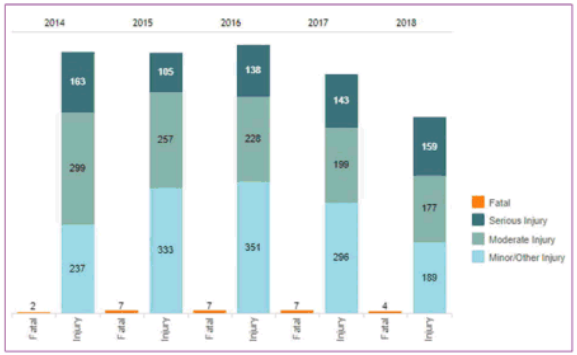


Figure 30: Summary of Casualty Crash Data in Parramatta LGA by year and severity (Source: Transport for NSW)

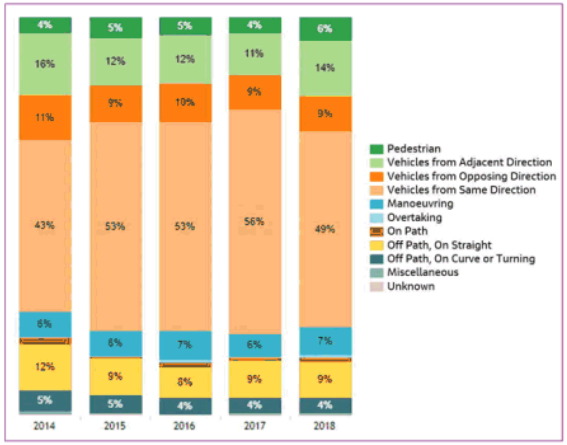


Figure 31: Type of Crash Types (Source: Transport for NSW)

Overall, the most common type of crash occurring in Parramatta involves vehicles from the same direction. The number of serious injuries has been increasing since 2015, with 159 serious injuries recorded in 2018. Moderate injuries have been decreasing since 2014, and minor/other injury crashes have been decreasing since 2016. However, it should be noted that as of 15 October 2014, self-reporting of non-casualty crashes was introduced, which meant NSW Police are not required to attend or investigate most crashes in which a vehicle is towed away but not one is injured or killed. The introduction of self-reporting crashes has resulted in a decrease in the number of crashes recorded by NSW police.

There has been a total of 27 fatal crashes within the 5 year period, 44% which were recorded to involve pedestrians. Figure 32 shows the location of the fatal crashes near Parramatta CBD. As shown, a large proportion of fatal crashes were reported on high speed roads, such as Western Motorway and James Ruse Drive (Cumberland Highway). A number of fatal crashes located in Parramatta CBD near Parramatta Station involved pedestrians, which highlights the importance of road safety for pedestrians in the CBD.

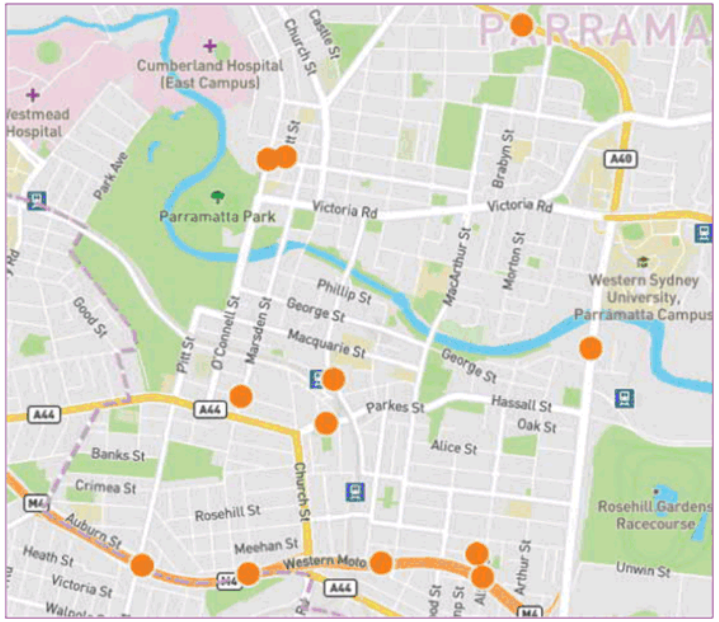


Figure 32: Fatal Crashes near Parramatta CBD (Source: Transport for NSW)

Speed and pedestrian safety will need to be prioritised in future plans to ensure a safe road environment for the Parramatta community.

3.7 Freight and Servicing

A major part of the State's freight and servicing activity is concentrated in key business districts and employment centres such as Parramatta CBD.

Parramatta is located near national key freight routes, including the M4 Western Motorway and the Main Western Railway Line. The M4 Western Motorway connects to the broader motorway network and industrial lands in Western Sydney. The Main Western Railway Line is a shared use freight line which started from Sydney and runs through the Blue Mountains, extending to the town of Bourke in the state's north-west.

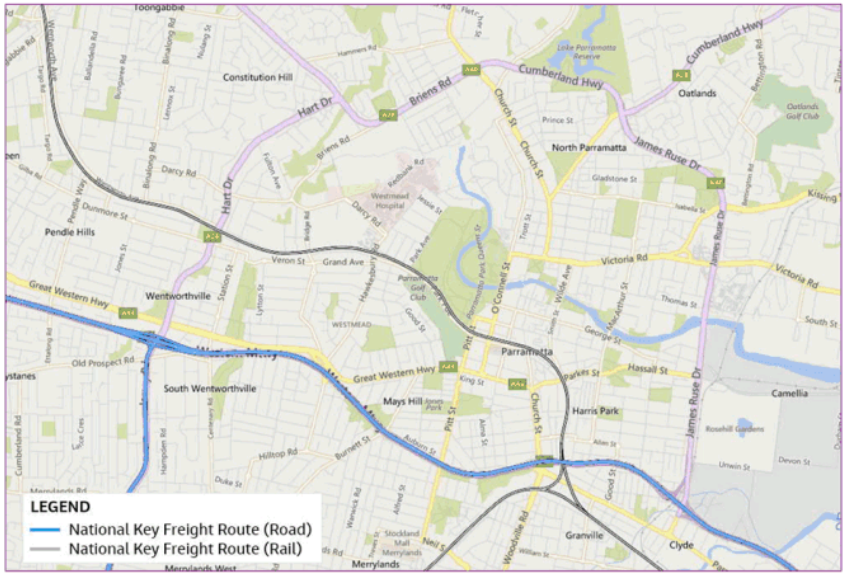


Figure 33: National Key Freight Routes near Parramatta[4]

As shown in Figure 34, the regional ring roads around Parramatta are included in TfNSW's Higher Mass Limit Network. On the fringes of Greater Parramatta is a major freight activity precinct spanning across Rydalmere, Camellia, Silverwater and Auburn which functions as a hub of freight and logistic functions. Access for freight into the precinct is challenging due to significantly constrained road network conditions.

Figure 34: Higher Mass Limit Network near Parramatta[5]

Based on the Sydney Roads Freight Hierarchy Map[6], there are three types of freight routes which the network can also be defined by:

- **Primary freight routes** typically carry high volumes of heavy freight vehicles and concentration. M4 Western Motorway and Cumberland Highway (A28) are identified as primary freight routes.
- **Secondary freight routes** provide links within regions for significant flows of freight. James Ruse Drive, between Pennant Hills Road and the M4 Western Motorway, and Woodville Road, south of Church Street, are identified as a secondary freight routes near Parramatta.
- **Tertiary freight routes** provide connections from the general Local Road system and the lower order elements of the State Road system to the primary and secondary freight routes. Tertiary freight routes near Parramatta include:
  - Great Western Highway
  - Parramatta Road

[4] *National Key Freight Routes Map, Department of Infrastructure and Regional Development, Accessed August 2020.* http://maps.infrastructure.gov.au/KeyFreightRoute/index.html

[5] *NSW Combined Higher Mass Limits (HML) and Restricted Access Vehicle (RAV) Map, TfNSW , Accessed August 2020.* https://www.rms.nsw.gov.au/business-industry/heavy-vehicles/maps/restricted-access-vehicles-map/map/index.html

[6] *Appendix D, Metropolitan Road Freight Hierarchy on the State Road Network Practice Note March 2011*

- Church Street, between Cumberland Highway and Victoria Road
- Pennant Hills Road between Cumberland Highway and Church Street
- Victoria Road, between Church Street and James Ruse Drive
- Pennant Street, between Victoria Road and James Ruse Drive

Within Parramatta CBD, there are currently 46 loading zone spaces that enable businesses and commercial drivers to deliver and receive goods. This number is declining. Even with current capacity their utilisation is high throughout the weekday. Freight vehicles in Parramatta face strong competition for limited road and kerbside space between 9am and 12pm on weekdays. As a result, freight vehicle drivers need to walk longer distances to delivery points and therefore dwell longer in kerbside loading zones, further restricting access.

To increase efficiency, designing infrastructure and regulations that support innovative and efficient freight, as well as supporting private sector efforts of best freight practices should be explored further.

3.8 Private Vehicles and Parking

Private vehicle is the primary transport mode for areas without immediate access to public transport. The relative attractiveness of accessing destinations by car can be strongly tied to parking supply and the cost of parking. Parking can also be very important for supporting visitation, local businesses and traders in Parramatta CBD.

3.8.1 Parking Supply

In 2016, there were more than 28,000 total parking spaces in Parramatta CBD[7], with 13,000 publicly accessible parking spaces and 15,000 private parking spaces. The publicly accessible parking spaces comprises of Council-owned on-street, on-grade and multi-level car parks, as well as private facilities such as Westfield Shopping Centre. The private parking spaces in Parramatta CBD are found in commercial and residential buildings that are inaccessible to the general public.

Figure 35 shows the commercial blocks with the highest volume of parking are generally found in the traditional core of Parramatta CBD and is linked to existing land uses as the greatest commercial and retail activity is located within the traditional Parramatta CBD. For example, Westfield Parramatta accounts for approximately 17% of all existing parking spaces in the area.

As mentioned in the *Strategic Transport Study Technical Paper 3*, almost 14,000 additional parking spaces are proposed as part of new developments in the Parramatta CBD planning proposal area. The location of the proposed additional parking is shown in Figure 36. The additional spaces are shown to be largely centred adjacent blocks with high existing parking numbers. It is considered that large contributors to these increases are high-density mixed-use proposals at the northern end of Auto Alley (south of Westfield Parramatta) and Parramatta Square development. The location of many of these parking spaces closely coincides with critical transport infrastructure services both current (buses accessing Parramatta interchange) and proposed (Parramatta Light Rail); inferring potential conflict for road space between modes and congestion.

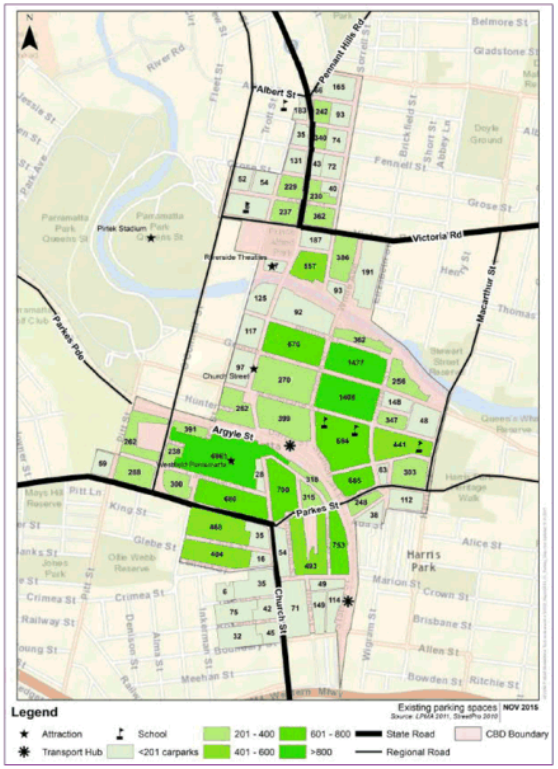


Figure 35: Existing (2016) parking supply in Parramatta CBD (Source: Strategic Transport Study, Technical Paper 3, Parking Review, 2017)

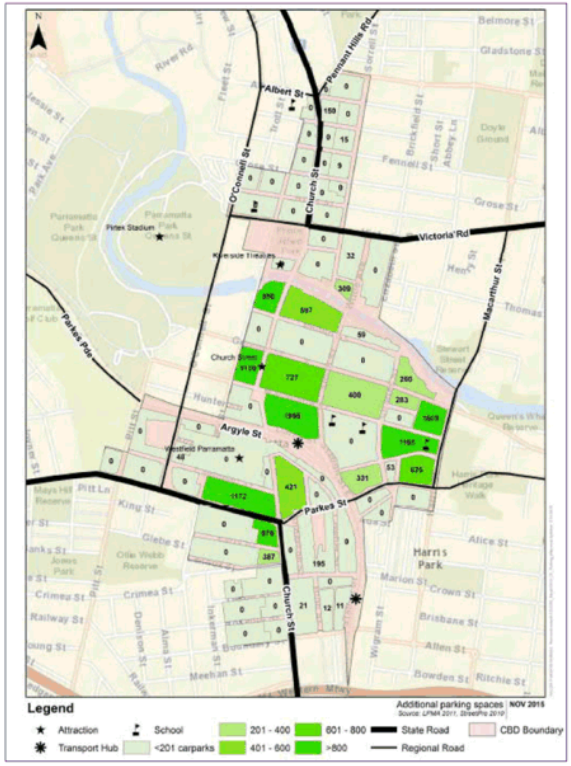


Figure 36: Additional parking supply in Parramatta CBD[8] (Source: Strategic Transport Study, Technical Paper 3, Parking Review, 2017)

[7] *Parramatta CBD Public Car Parking Strategy (Draft)*, City of Parramatta (2017) (www.cityofparramatta.nsw.gov.au); at https://www.cityofparramatta.nsw.gov.au/sites/council/files/inline-files/Public%20Car%20Parking%20Strategy.pdf

[8] Note, the additional parking supply shown does not consider recent changes, such as the closure of the Riverbank carpark (Powerhouse), the closure of the City Centre carpark (Sydney) and the changes to kerbside parking on George Street and Macquarie Street as part of the Parramatta Light Rail project.

3.8.2 Parking Requirements for Development

The original Parramatta parking rate as indicated in the 2011 Parramatta Local Environmental Plan (PLEP) is shown in Table 4.

Table 4: Original Parramatta Parking Rate (Source: PLEP 2011)

Land Use	Maximum Parking Rate
Multi dwelling (Residential)	1 space/ dwelling plus 1 parking space to be provided for every 5 dwellings for visitors
Commercial	1 space/ 100m^2 GFA

For commercial (office) land use, this allowed up-to one parking space for every 4.12 employees, suggesting theoretically, developments could support a 24% car driver mode share in Parramatta. In contrast, commercial land use in North Sydney CBD allocates a maximum of one parking space available for every 16.67 employees (6% car driver mode share).

In 2017, Council adopted, on an interim basis, lower maximum requirements for car parking based on City of Sydney rates for all CBD development being considered through a planning proposal or design excellence approval process.

However, this history of greater parking allowances has led to Parramatta having a greater number of parking spaces than other comparable CBDs within Sydney. And these figures are further inflated by publicly accessible car parking spaces available. Based on JTW data, actual observed car drive mode share could be much higher than 24% (closer to 49%), once other parking spaces such as on-street, public and private parking spaces are considered in Parramatta CBD.

3.8.3 Cost of Commuter Parking

The early bird and hourly costs of commuter parking at key parking areas within Parramatta are shown in Figure 37. As shown, hourly costs range between $3-$5 per hour and the early bird rate fluctuates between $14-$21. This is low in comparison to rates in Sydney CBD which are generally $25-$45 per day. It should be noted that incomes may be lower in Parramatta CBD than other CBDs which may affect the demand for paid parking.

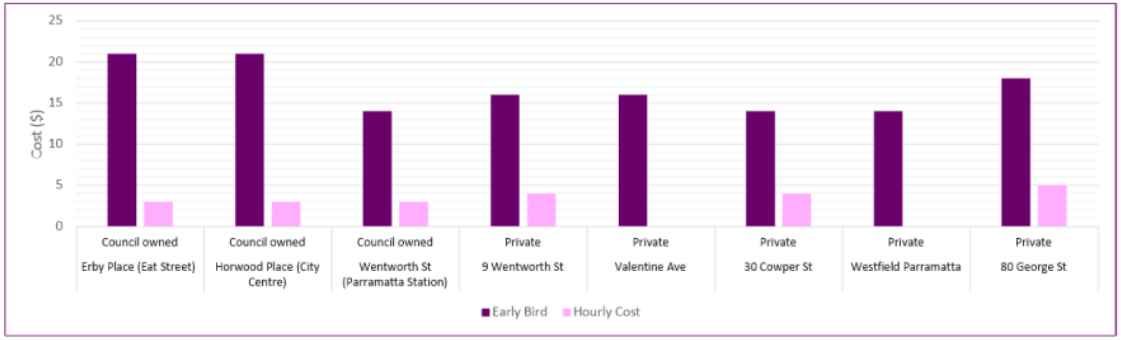


Figure 37: Parramatta CBD Parking Costs – Early Bird and Hourly Costs

An analysis of current parking costs shows early bird parking costs in Parramatta are generally lower than comparable CBDs in Greater Sydney. Figure 38 shows early bird parking costs, comparing Parramatta CBD with other comparable CBDs within Greater Sydney. With an average cost of $17, Parramatta CBD is significantly lower than the other benchmarks, suggesting the comparative attractiveness for workers and visitors to drive and park in Parramatta.

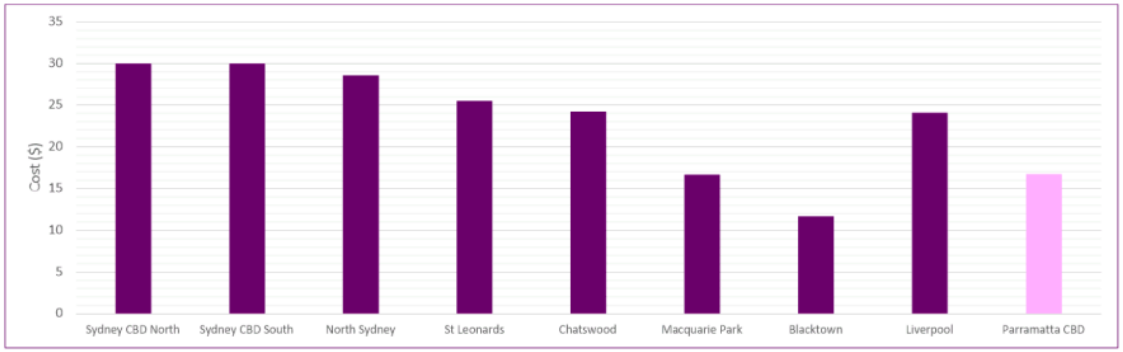


Figure 38: Early Bird Parking Cost Comparison with Comparable CBD's in Greater Sydney

A comparison of early bird parking costs with associated daily public transport rates in selected Australian CBD's is shown in Table 5. With the daily public transport rate cap for Greater Sydney (Opal) at $16.10, the Parramatta CBD's average early bird rate of $19 offers an inexpensive price that may influence car users to continue choosing to drive to work, given its convenience. This contrasts with Sydney CBD and Melbourne CBD, where vehicle use is below 20%, and early bird rates are significantly higher than the cost of public transport.

Table 5: Early Bird Parking Cost vs. Public Transport Daily Rate Cap in Comparable CBDs (Accessed March 2020)

Comparable CBD	Early-bird Rate	Public Transport Daily Rate Cap	Car Drive Mode Share (JTW)
Parramatta CBD	$19	$16.10	49%
Sydney CBD	$30	$16.10	13%
Melbourne CBD	$21	$9.00	19%

Parking space levies are imposed on owners of off-street commercial and office parking spaces with the aim of discouraging car use to reduce congestion. They are currently applied within Parramatta, levied at a rate of $840 per space per year. This is significantly lower than the rate imposed in Sydney CBD and North Sydney of $2,350.

3.8.4 Parking Demand

In the 2016 Census, there were approximately 10,500 private dwellings in Parramatta (SSC), with an average of 1 motor vehicle per dwelling. In comparison, the 2011 Census showed Parramatta (SSC) had approximately 8,400 private dwellings with an average motor vehicle of 1.1. Whilst average motor vehicles per household decreased slightly, there is still a 13.5% increase of total motor vehicles in Parramatta within the 5 year period. The observed trend shows that as population growth in Parramatta (SSC) grows, car growth is also observed within the suburb. This could have a direct implication for Parramatta CBD's future, with greater numbers of cars likely to drive demand for more parking facilities.

In Council-owned carparks within Parramatta CBD (shown in Figure 39), the Erby Place (Eat Street) and Horwood Place (City Centre) parking facilities accommodate a high number of daily vehicles, with occupancy rates over 90%[9]. In contrast, the Wentworth St (Parramatta Station) carpark has more parking spaces, but accommodates fewer cars daily, with a daily occupancy of 55%. Horwood Place Carpark will be closed to accommodate the proposed Metro West station in Parramatta.

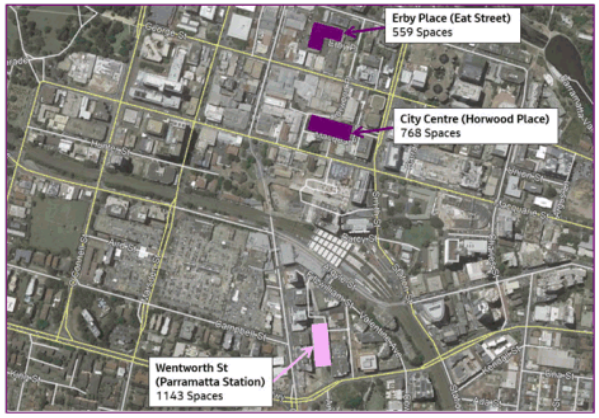


Figure 39: Location of selected Council-owned carparks

3.8.5 Key Parking Supply and Demand Issues

From analysing the current supply and demand in Parramatta, driving to work and parking in Parramatta is relatively attractive as a JTW option, because:

- **High supply:** Parramatta CBD has more than 28,000 parking spaces, equating to roughly one car space for every 1.8 employees in the CBD. The City of Sydney estimates there is just one parking space for every 6 workers in the Sydney CBD.
- **Low cost:** Public 'early bird' parking rates are approximately a third less of those in Sydney CBD and have lower applied parking levies.

Although Council limits on-site parking supply, the maximums as indicated in the current Parramatta CBD parking rate, are about twice for residential and four times for commercial than in North Sydney and Sydney CBD. Based on the expected growth of commercial and residential space in Parramatta, the current Parramatta CBD parking rates have the potential to enable significantly higher volumes of private vehicle traffic. This could otherwise result in a surplus of parking.

The cost of parking to users is an important factor affecting commuter's decisions on mobility. The low cost of parking in Parramatta CBD may encourage people to drive alone rather than carpool, walk, bike or take public transport. This results in more people on the roads and a higher demand for parking. If Parramatta is committed to encouraging the growth of sustainable transport and reducing private vehicle use, parking policy and pricing changes are needed to achieve Parramatta CBD's development goals of reducing car use.

4.0 Transport Modelling

Transport modelling is an important component of the methodology used to assess the quantitative impacts of the Parramatta Planning Proposal on the transport network.

Through the modelling process, it can better identify the full benefits and impacts of transport plans and how the Parramatta Planning Proposal will impact the network in 40 years. It is also used to understand how many people or vehicles will be using the proposed network to scale it efficiently.

4.1 Transport Modelling Approach

The process involved a multi-tier transport modelling approach to carry out an assessment of the current and future performance of the increase in travel demand as a result of the implementation of Parramatta CBD planning proposal. The assessment of future travel demand and travel patterns of the Parramatta planning proposal area was undertaken using a suite of modelling tools that informed the study of the transport needs to support Parramatta's growth. Table 6 provides an overview of the transport modelling methodology used in the assessment of the project and is described in the following sections.

Table 6: Transport Modelling Approach

Modelling Tool	Purpose
Sydney Strategic Travel Model (STM)	Forecast trip generation, trip distribution and transport mode share
Sydney Traffic Forecast Model (STFM)	To inform what roads motorists will choose to travel on for 2026 and 2036
Aimsun mesoscopic traffic model	Detailed assessment of road network capacity in 2026
Sidra Intersection Model	Assess the intersection network performance for peak hour traffic demand

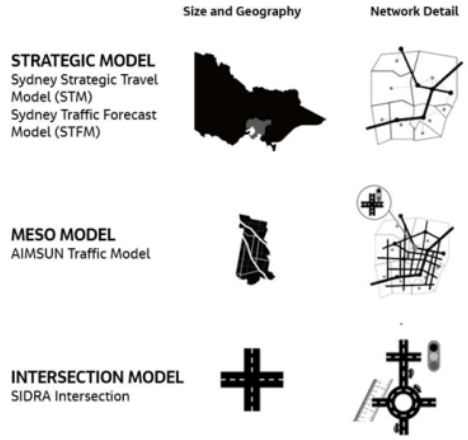


Figure 40: Transport Modelling Hierarchy

4.1.1 Sydney Strategic Travel Model (STM)

To identify the transport needs to support Parramatta's growth, the Sydney Strategic Travel Model (STM) was used. STM is a multi-modal strategic model developed and maintained by TfNSW to analyse high level impacts of land-use and transport network changes; forecast growth in demand by private vehicle and public transport modes that consider future land use, transport network and policy scenarios. For this study, STM was used to:

- Forecast travel demand generated by the Parramatta CBD
- Identify mode share trends in mechanised modal demand, travel directionality and trip distances
- Estimate growth along key transport corridors and links on approach to the Parramatta CBD and other select locations.

4.1.2 Sydney Traffic Forecast Model (STFM)

The Sydney Traffic Forecast Model (STFM) is developed and operated by TfNSW. It provides a platform to understand changes in future weekday traffic patterns under different land use, transport infrastructure and pricing scenarios. For the Parramatta ITP, STFM was used to determine traffic flows across the road network within the study for the theoretical years of 2026 and 2036.

It should be noted that there are limitations with strategic modelling. On the aggregate level, macro-models have been shown to be accurate, however their accuracy diminishes when focussing on a specific route or site. Generally, macro-models cannot directly or accurately model the effect of capacity constraints on the transport network, without the aid of other modelling software, such as AIMSUN and SIDRA.

4.1.3 Mesoscopic Operational Model

While strategic modelling tools such as the STM and STFM can be used to identify the performance of the road network, their assumptions are broad-based and generally do not model intersections which are key determinants constraining network capacity. For the assessment of this project, the Greater Parramatta and Olympic Park Model (GPOP) Aimsun model developed for Parramatta Light Rail was used to cordon off a subarea covering the study area specified by TfNSW. The road network within the study area was updated to include the latest changes to land use and infrastructure. The model was principally used to identify the travel route of vehicles based on the level of congestion and delay in the network for the "Base Case" year of 2016 and for the 2026 future year scenario to test the impact of the partial planning proposal on travel patterns and Interim Parking Rates.

4.1.4 SIDRA Intersection Model

SIDRA intersection modelling tool was used to aid with the design and evaluation of the key intersections within Parramatta. Stand-alone models of one simple intersection or a set of closely spaced intersections were used to provide a high level of detail including geometries, driver behaviour and signal plans. SIDRA provides estimates of capacity and performance statistics such as delays, queue length etc. by lane for all approaches to an intersection.

4.1.5 Geographic Model Extents

The extent of the study area and location of intersections to be surveyed were identified in consultation with TfNSW. The model area, shown in Figure 41 covers a region broadly defined by the Parramatta Outer Ring Road covering James Ruse Drive, Cumberland Highway and M4 Motorway. The Parramatta CBD area is defined for modelling purposes as the area bound by the inner ring roads around the CBD, including sections of the Great Western Highway, Harris Street, Victoria Road and O'Connell Street, illustrated in green.

Figure 41: Core Model Areas (Source: STM)

4.1.6 Modelled Scenarios

There are three modelled land use scenarios used in this analysis, detailed in Table 7.

Table 7: Parramatta CBD planning proposal land use scenarios

Scenario	Description
Base Case	Assumes business as usual (no Parramatta CBD Planning Proposal) and includes full development of the already gazetted Parramatta Local Environmental Plan 2011 (LEP)
Partial Parramatta CBD Planning Proposal (Partial PP)	Includes full development of the LEP plus known site-specific planning proposals
Full Parramatta CBD Planning Proposal (Full PP)	Assumes full 40-year supply to 2056

Three theoretical forecast years of 2026, 2036 and 2056 were selected to be modelled to align with land use forecasting years. For the purposes of testing the CBD planning proposal, it is assumed that known site-specific planning proposals could be delivered to market by 2026. By 2036 and 2056, additional development over and above site-specific planning proposals is more plausible, up to a full build out of the capacity of the CBD planning proposal (subject to market conditions). The population and employment for the three forecast years are for the purpose of assessment of the incremental impact of the planning proposal against a base. The actual take up of residential and commercial developments would be driven by the market demand at each forecast year.

To undertake a comparison against an assumed baseline, the following scenarios were assumed and outlined in Table 8.

Table 8: STM Scenarios

Scenario	2026	2036	2056
Base	Yes	-	-
Partial PP	Yes	Yes	Yes
Full PP	-	Yes	Yes

Notes: 2026: Full PP land use forecast not considered achievable as this represents 40 years of development
2036 and 2056: Base land use forecast not considered realistic as a baseline comparison

As shown, the full Parramatta CBD planning proposal (Full PP) has not been modelled for the 2026 forecast year, as it is not considered achievable as this represents 40 years of development. In addition, the base land use forecast (full development of the existing LEP) has not been modelled for the 2036 or 2056 forecast year, as the known site-specific planning proposals (as represented by the Partial PP scenario) are assumed to have been approved and constructed by 2036. For 2036 a test of full PP has been done although it would be unlikely for the full PP materialising by that year.

The impacts of the Planning Proposal can be observed through comparing the difference in results between the Partial PP and the Full PP.

4.1.7 Demographic Projections for CBD

The land use forecasts provided by City of Parramatta are provided in Table 9. As shown in the table, there is significant growth observed, with both employment and population expected to more than double in the next 40 years. This will result in more trips in and out of Parramatta CBD.

Table 9: Parramatta CBD planning proposal land use forecasts

Year	Employment	Employment Growth	Population	Population Growth
2016	51,300		23,700	
2026	81,600	+30,300	33,800	+10,100
2036	88,700	+7,100	42,700	+8,900
2056	110,600	+21,900	64,500	+21,700

4.2 Forecast travel trends

4.2.1 Daily Trips

The daily number of trips, regardless of mode, are forecast to increase by approximately 50% (141,000) under the current LEP when it is fully implemented. The development of the known site-specific planning proposals results in an 8% increase on top of the 2026 base in daily volumes to/from the planning precinct area. This increase is not significant when compared to the increase that would be experienced under the current LEP when fully implemented.

When compared to the current LEP (2026 Base), the implementation of the full Planning Proposal (PP) results in the daily number of trips increasing by another 48% (198,000) in 2036 and by 54% (225,000) in 2056 when compared to 2026 under the current LEP.

Figure 42 shows the change in the total number of daily trips across the planning scenarios.

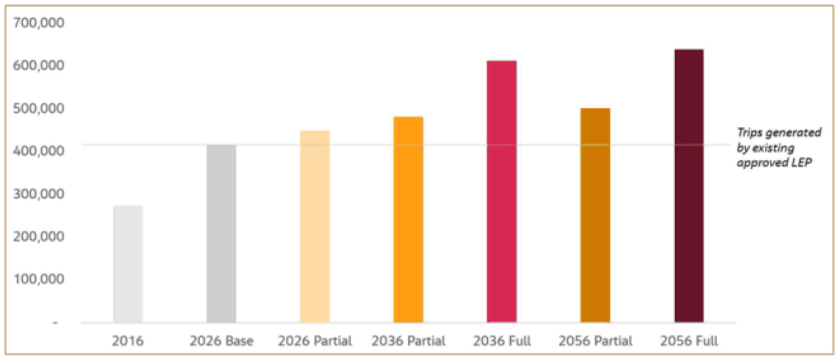


Figure 42: Total Daily Trips (Source: STM)

4.2.2 Modal Share

STM modelling has been used to assess modal share across the forecasted scenarios. Strategic models such as the STM have the capability of modelling travel demand across the full spectrum of travel modes over large areas (usually at the city-wide scale). These models are focussed on replicating the behaviours associated with travel choices including trip generation, trip distribution and mode choice. To allow these behaviours to be modelled at a large scale, assumptions and simplifications to the capacity of the transport network are usually made that mean these models are not constrained by capacity. It should be noted that STM modelling does not consider capacity constraints of the Parramatta road network. Further mode share sensitivity testing can be found in Section 4.6.

The assessment of mode of travel of people travelling to and from Parramatta CBD area shows approximately three quarters of daily trips are made by cars with only 21% of trips by public transport. Walking and cycling comprise 6% of total daily trips.

The implementation of Parramatta Light Rail (PLR) stage 1 and 2 by 2026 and Sydney Metro West by 2036 reduce the car mode by 9-10% with corresponding increases in public transport modes share to almost 30% of all trips by 2036. Operation of Sydney Metro in modelled year 2036 does not appear to impact the rail / light rail / ferry mode share significantly but increases the bus mode share in 2036 and onwards. This is likely to be due to the changes in the bus network to support Sydney Metro West.

By 2056, the car mode share would comprise approximately 62% of all daily trips or a reduction of 12% compared to the base year.

The implementation of the planning proposal does not alter the mode share across each year of assessment although the total number of trips increases due to higher level of land use from the planning proposal. The gradual shift in mode share away from car is due to network changes that includes improved public transport and a higher level of congestion on roads increasing the car travel times that make them less attractive than public transport. The daily mode share of trips to/from the planning proposal area for each scenario is summarised in Table 10 and illustrated in Figure 43.

Table 10: Daily Mode Share (Source: STM)

SA3 Region	2016	2026 Base	2026 Partial PP	2036 Partial PP	2036 Full PP	2056 Partial PP	2056 Full PP
Car Driver	149,000	210,000	227,000	235,000	294,000	236,000	295,000
Car Passenger	53,000	72,000	77,000	77,000	98,000	74,000	95,000
Rail	34,000	76,000	83,000	89,000	112,000	98,000	124,000
Bus	22,000	34,000	37,000	53,000	71,000	63,000	85,000
Walk/Bicycle	16,000	24,000	25,000	29,000	37,000	32,000	42,000
Total	**274,000**	**415,000**	**451,000**	**482,000**	**613,000**	**502,000**	**640,000**

Notes: Rounded to nearest 1,000 trips

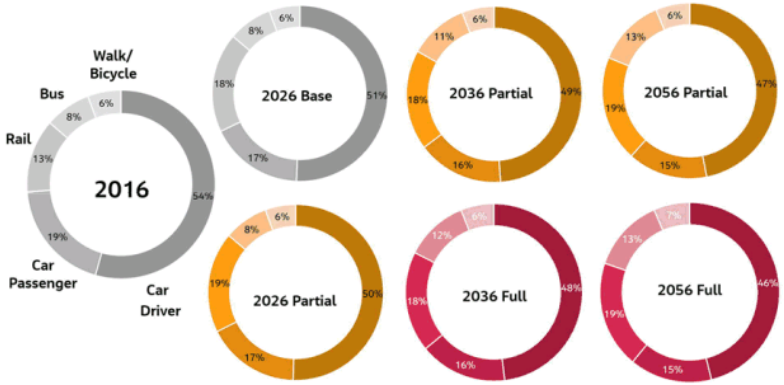


Figure 43: Daily Mode Share for Daily Trips to/from Parramatta CBD (Source: STM)

The AM and PM peak hour mode share proportions across the future year scenarios are summarised in Table 11.

Table 11: AM and PM peak Mode Share Proportions (Source: STM)

To/From PP	Mode	2016	2026 Base	2026 Partial PP	2036 Partial PP	2036 Full PP	2056 Partial PP	2056 Full PP
AM Peak (2-hour)								
From PP	Car	68%	63%	61%	60%	58%	58%	56%
	Car (Work)	54%	49%	47%	44%	43%	41%	40%
	Public Transport	18%	21%	22%	24%	24%	26%	26%
	Walk/Bicycle	15%	16%	17%	16%	18%	16%	18%
To PP	Car	60%	52%	52%	49%	49%	46%	46%
	Car (Work)	56%	48%	48%	44%	44%	40%	40%
	Public Transport	28%	35%	34%	37%	36%	40%	39%
	Walk/Bicycle	12%	13%	14%	14%	15%	13%	15%
PM Peak (3-hour)								
From PP	Car	64%	59%	58%	56%	56%	54%	54%
	Car (Work)	62%	55%	55%	52%	51%	47%	47%
	Public Transport	21%	26%	25%	27%	26%	30%	29%
	Walk/Bicycle	15%	16%	17%	16%	18%	16%	18%
To PP	Car	76%	73%	72%	71%	69%	70%	68%

To/From PP	Mode	2016	2026 Base	2026 Partial PP	2036 Partial PP	2036 Full PP	2056 Partial PP	2056 Full PP
AM Peak (2-hour)								
	Car (Work)	64%	60%	58%	54%	54%	51%	50%
	Public Transport	11%	14%	14%	16%	16%	17%	17%
	Walk/Bicycle	12%	13%	14%	14%	15%	13%	15%

As shown, during the AM peak, the journey to work (JTW) car mode share declines to 44% in 2036 Partial PP, and under the 2056 Full PP, it declines to 40% in both directions. In the PM peak, the JTW car mode share remains between 47-50% under the 2056 Full PP. These proportions are higher than the visionary target outlined in the *Parramatta CBD Strategic Transport Study* of 40% JTW car mode share by 2035.

4.2.3 Trip Generation

The number of daily trips to/from the Planning Proposal area from each SA3 region across Sydney has been calculated, with the top nine SA3 regions shown in Figure 44.

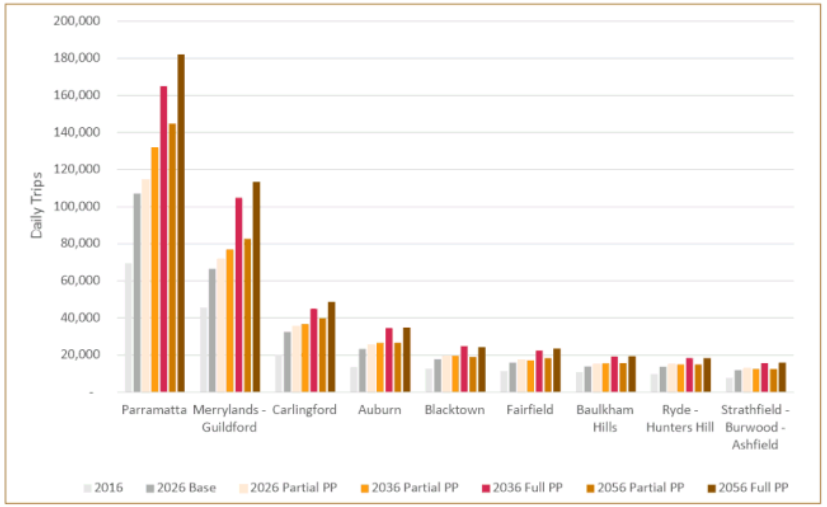


Figure 44: Daily Trips to/from Parramatta CBD by SA3 comparison (Source: STM)

As shown, there is a large increase in the number of trips within the Parramatta SA3, with more than 182,000 trips expected under the full 2056 PP, an increase of 113,000 trips compared to the 2016 base. This is likely an outcome of increased land use forecasts, the proposed significant residential component of the CBD, and densification of nearby precincts such as Parramatta North and Camellia. The increase in shorter trips are expected as homes are provided closer to jobs.

Merrylands-Guildford SA3 similarly experiences increased trips to/from Parramatta CBD. Located adjacent to Parramatta SA3, Merrylands-Guildford is connected to Parramatta CBD via the T2 and T5 rail lines, as well as bus services such as Route 907. Woodville Road and Church Street provide key road corridors to access Parramatta CBD. A significant increase in daily trips to/from the study area from Merrylands-Guildford is seen under the full PP scenario compared to the partial PP scenario. This may be associated with the significant increase in employment along Church Street in the southern end of the study area as a result of the implementation of the planning proposal.

The proportion of daily trips to/from the planning proposal area from each SA3 region across Sydney has been calculated, with the top nine SA3 regions shown in Figure 45. These trips are also illustrated in Figure 46 for 2056 under the full PP.

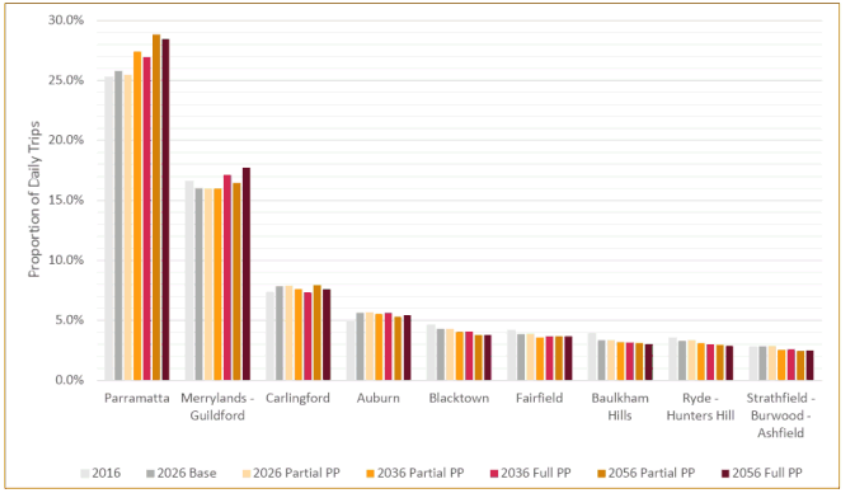


Figure 45: % of Daily Trips to/from Parramatta CBD by SA3 comparison (Source: STM)

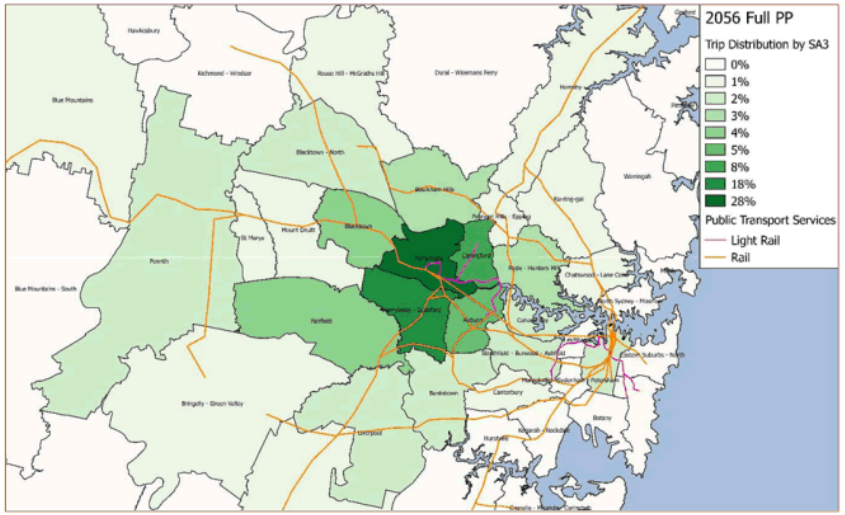


Figure 46: Daily trips by SA3 Map for 2056 under full PP (Source: STM)

The results indicate an increase in the trips to/from Parramatta, Carlingford and Auburn. This may reflect the changes in travel patterns associated with Parramatta Light Rail (Stages 1 and 2) which improves accessibility to Parramatta from these areas.

SA3 regions that are not connected directly with Parramatta by rail or light rail include Baulkham Hills, Ryde / Hunters Hill (transfer at Strathfield) and Bankstown (transfer at Lidcombe). For Fairfield SA3, although served by the T5 line, their western end is far from the rail stations. Fairfield SA3 is connected to Parramatta via the Liverpool-Parramatta T-way. As shown, the proportion of trips decline although the number of trips increase. Additional improvements to public transport and active transport may need to be investigated to determine how to better service this region.

4.3 Public transport patronage

4.3.1 Rail Patronage

STM was used to assess the impact of the planning proposal on rail ridership. The rail patronage for the two-hour AM peak period for selected locations are provided in Table 12 for each scenario.

Table 12: Rail Trips - AM 2 Hour Peak Period (Source: STM)

SA3 Region	2016	2026 Base	2026 Partial PP	2036 Partial PP	2036 Full PP	2056 Partial PP	2056 Full PP
T1 (Eastbound)							
West of Westmead	28,500	38,100	38,300	48,900	49,600	65,900	66,700
Westmead to Parramatta	29,900	39,600	39,800	45,900	46,700	59,500	60,500
Parramatta to Harris Park	31,200	48,000	48,900	52,500	54,000	68,600	69,900
Harris Park to Granville	31,200	46,800	47,600	51,000	51,900	66,700	67,400
East of Granville	40,900	52,900	53,700	56,900	57,600	75,200	75,600
T1 (Westbound)							
East of Granville	8,900	18,300	19,000	18,900	20,600	24,500	25,900
Granville to Harris Park	8,800	17,000	17,700	17,500	19,200	22,200	23,800
Harris Park to Parramatta	10,600	25,700	26,500	28,700	30,400	37,900	39,500
Parramatta to Westmead	4,000	8,000	8,000	11,900	11,800	17,900	17,800
West of Westmead	2,900	6,700	6,700	8,900	9,000	12,700	12,700
T5							
Merrylands – Harris Park	1,400	8,000	8,100	10,400	11,000	14,700	15,400
Harris Park – Merrylands	400	1,200	1,200	1,300	1,400	1,700	1,700
Sydney Metro West (SMW) - Eastbound							
Westmead to Parramatta	-	-	-	9,700	9,500	16,300	16,000
East of Parramatta	-	-	-	15,400	15,800	24,500	24,900
Sydney Metro West (SMW) - Westbound							
East of Parramatta	-	-	-	6,100	6,500	8,700	9,300
Parramatta to Westmead	-	-	-	1,800	1,800	2,900	2,900

Notes: Rounded to nearest 100 trips

By 2056, rail demand on the T1 line between Parramatta and Harris Park is expected to reach 70,000 passengers in the eastbound direction. Assuming a capacity of 1,200 passengers per train, this would require a service almost every 2 minutes to accommodate the increased demand. Currently rail services to Parramatta arrive every 2-3 minutes, however other stations such as Westmead and Harris Park only experience a service every 6-15 minutes due to express services skipping the station. Increased frequency and capacity upgrades to existing trains could be considered to accommodate the increased demand.

There is also a significant increase in the northbound direction on the T5 line between Merrylands and Harris Park, reaching 15,400 passengers during the two-hour AM peak in the 2056 Full PP scenario. Assuming a capacity of 1,200 passengers per train, this would require a service at least every 10 minutes to accommodate the demand. Currently train services on the T5 line run approximately every 30 minutes, therefore patronage demand cannot be accommodated within the existing rail services.

The highest increase due to the planning proposal is observed on the T1 line in the outbound direction (1,700 passengers between Granville and Parramatta in 2036. This represents a 10% increase in passengers between Granville and Harris Park stations and a 6% increase in passengers between Harris Park and Parramatta.

The rail boarding and alighting volumes for the two-hour AM peak period for selected rail stations are provided in Figure 47 and Figure 48 for each scenario.

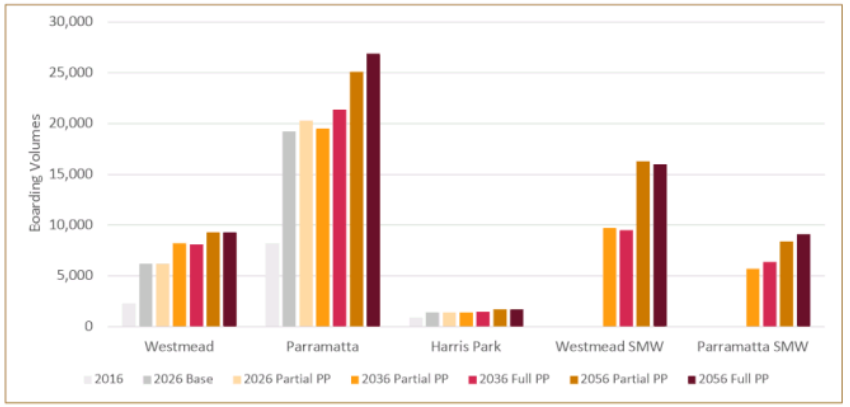


Figure 47: Rail Boarding Volumes - AM 2 Hour Peak Period (Source: STM)

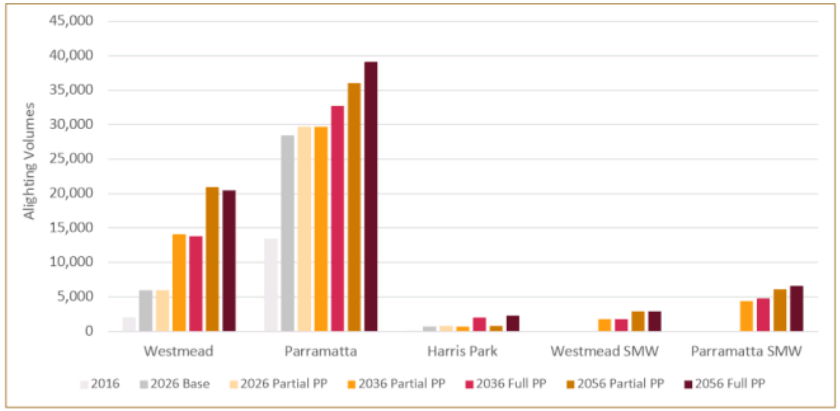


Figure 48: Rail Alighting Volumes - AM 2 Hour Peak Period (Source: STM)

As indicated, the full CBD planning proposal would increase boarding and alighting volumes by up to 10% at Parramatta and Parramatta (Sydney Metro West) stations. At Harris Park, the full CBD planning proposal is expected to result in an increase of 1,300 in 2036 and 1,500 in 2056 during the 2-hour AM peak, with an almost tripling of alighting passengers at Harris Park. This is likely due to extending the Commercial Core down Church Street to the Auto Alley Precinct.

The change in boarding and alighting volumes at Parramatta station is shown in Figure 49.

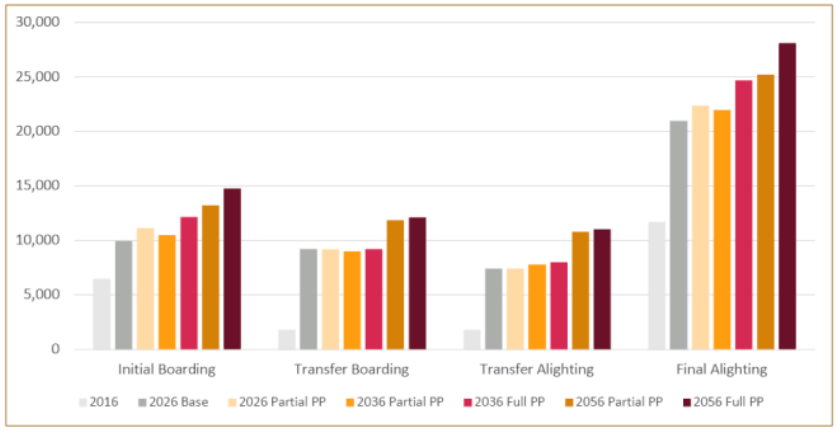


Figure 49: Rail Boarding / Alighting Volumes 2 hour AM peak period – Parramatta Station (Source: STM)

At Parramatta Station, there are 70 services per hour (total in both directions) stopping, which includes the Blue Mountain trains. Under the full planning proposal, there would be an additional 4,900 passenger movements at the train station during the 2-hour AM peak by 2056. This represents an average of about 55 passenger movements per train in the peak one-hour period, based on a peak hour factor of 77%. Such increases in passenger movements at Parramatta Station may require increased rail capacity and services, as well as potential upgrades to station capacity. Without increased rail capacity and services to address long term demand growth, rail customers may shift to other car-dependent modes of transport, which would impact on other road users and increase congestion on the local and State road network.

4.3.2 Light Rail Patronage

The construction of Stage 1 of Parramatta Light Rail recently commenced. It spans between Westmead and Carlingford with 16 stops to be delivered by 2023. Stage 2 of PLR will connect Stage 1 and Parramatta CBD to Ermington, Melrose Park, Wentworth Point and Sydney Olympic Park with 10-12 stops. A final Business Case for the second stage of Parramatta Light Rail is still being considered by the NSW Government. However, the TfNSW standard assumptions for 2026 includes PLR Stage 1 and Stage 2 therefore both are assumed. The change in light rail patronage in 2026, 2036 and 2056 due to the different land use scenarios are summarised in Table 13.

Table 13: Change in light rail patronage - AM 2 Hour Peak Period (Source: STM)

Year	Base	Partial PP	Full PP	Difference	% Difference
2026	8.200	8,400	-	200	2.4%
2036	-	11,400	11,700	300	2.6%
2056	-	14,500	14,800	300	2.1%

Notes: Rounded to nearest 100 trips

The results show a marginal increase in light rail patronage due to the planning proposal. With 64 light rail services over the two-hour AM peak period (across both the Stage 1 and Stage 2 alignments), this would represent an increase of about 5 passengers per service averaged over the two-hour peak period in 2036 and 2056. The full planning proposal scenario is expected to increase patronage on PRL (Stage 1 and Stage 2) by under 3% in 2036 and 2056. No additional upgrades should be needed to cater for the increased patronage if the full planning proposal scenario were to proceed.

4.3.3 Bus Patronage

Bus Routes

Based on an analysis of the modelled bus patronage, the following three bus route services are forecast to have the highest increase in patronage due to the planning proposal:

- M91: Hurstville to Parramatta – travels to/from the Parramatta CBD via Church Street
- 907: Bankstown to Parramatta
- T80: Liverpool to Parramatta – travels to/from the Parramatta CBD via Argyle Street

The change in patronage for these three services is shown in Table 14.

Table 14: Change in bus patronage on key routes – AM 2 Hour Peak Period (Source: STM)

Bus Route	2026		2036		2056	
	Difference	% Diff	Difference	% Diff	Difference	% Diff
M91	<50	1%	1,200	15%	1,400	12%
907	<50	2%	300	28%	400	22%
T80	<50	1%	300	3%	300	2%

Notes: Rounded to nearest 100 trips

Assuming a total capacity of 70 passengers per bus, the above results indicate that these three services would require an extra 20 services (M91), 6 services (907) and 4 services (T80) to cater for the additional bus patronage in 2056. Other services not mentioned above may also require some additional services to accommodate the additional forecast passenger demand.

Two-way Bus Patronage Roads

The two-way bus patronage for the two-hour AM peak period for key roads which cross the outer cordon of James Ruse Drive, Great Western Highway and M4 Motorway are provided in Figure 50 for each scenario. The increases in patronage due to the planning proposal at these locations are generally under 5%, with some locations expecting an increase of between 5% and 11%.

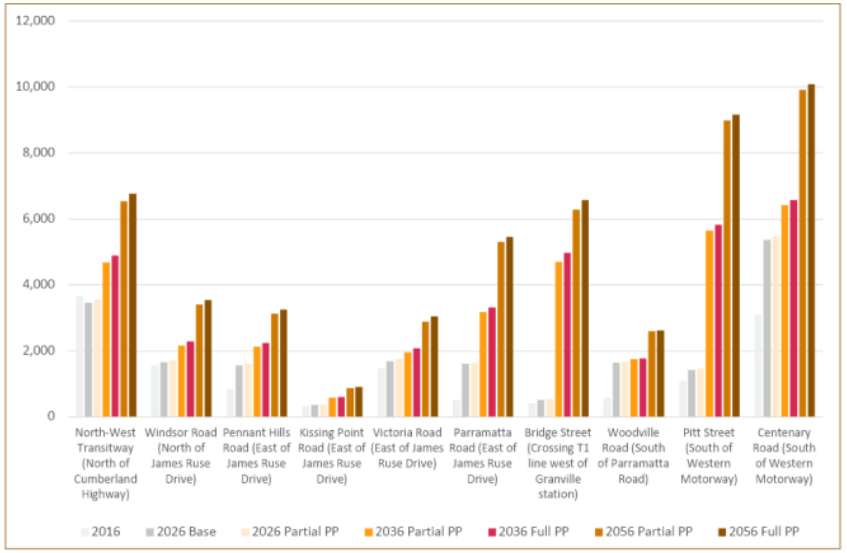


Figure 50: Two-way bus patronage at the outer cordon – 2hr AM Peak (Source: STM)

There are five bus corridors with greater than 5,000 passengers (total two-way) across the two-hour AM peak period in 2056: North-West Transitway, Parramatta Road, Bridge Street, Pitt Street and Centenary Road. Assuming a total capacity of 70 passengers per bus, it would be expected that this would mean more than 71 bus services (total two-way) across the two-hour AM peak period would be expected along these corridors. Bus services along these corridors would be expected to occur every 3-4 minutes to cater for the increase in patronage.

4.3.4 Visionary Metro Lines

The *Greater Sydney Services and Infrastructure Plan* of Transport for NSW's *Future Transport 2056* plan identifies that initiatives for investigation for 10-20 years include the following:

- Parramatta to Epping high capacity train/mass transit links
- Parramatta to Kogarah high capacity train/mass transit links

Visionary initiatives (20+ years) that will be explored near Greater Parramatta include:

- Parramatta to Norwest mass transit/train link

To assess the patronage of these three visionary metro lines, STM was used. Note, these three lines are not in the reference STM model but were added as a test to identify what the line loading would be if in place by 2056.

Parramatta to Epping

The Parramatta to Epping rail link is approximately 9km in length, connecting Parramatta to Epping, via North East Parramatta and Carlingford. The two-hour AM peak boarding and alighting volumes across the indicative station locations between Parramatta and Epping is shown in Figure 51. Note, station locations shown are for modelling purposes only and are subject to change.

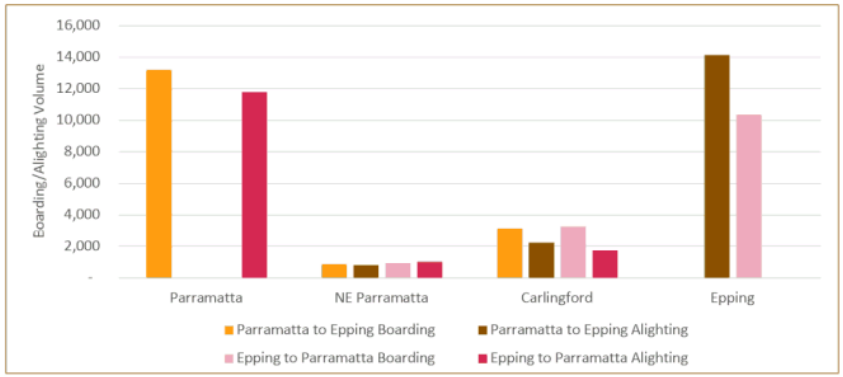


Figure 51: Boarding and Alighting Rail Patronage between Parramatta and Epping (two-hour AM Peak)

The line in the northbound direction from Parramatta to Epping is estimated to carry a rail patronage of 17,200 passengers in the two-hour AM peak. There are around 13,200 passengers boarding from Parramatta CBD (Sydney Metro West) and 3,100 passengers from Carlingford. 14,100 passengers are expected to alight at Epping.

The line travelling from Epping to Parramatta is estimated to carry a lower rail patronage of 14,500 passengers in the two-hour AM peak. From the STM modelling, the most popular stations to board are from Epping, with around 10,300 passengers, and Carlingford, with around 3,300 passengers boarding. Approximately 11,800 passengers are expected to alight at Parramatta.

Line loadings are shown in Figure 52 and Figure 53. The highest segment volume is 14,100 passengers between Carlingford and Epping. For westbound movements (Epping to Parramatta), the highest segment volume is 11,900 passengers between Carlingford and North East Parramatta.

Assuming a total capacity of 1,150 passengers per metro train, this level of demand would equate to more than 12 services in the northbound direction, and 10 services in the southbound direction across the two-hour AM peak period to cater for demand. This equates to a service every 10-12 minutes.

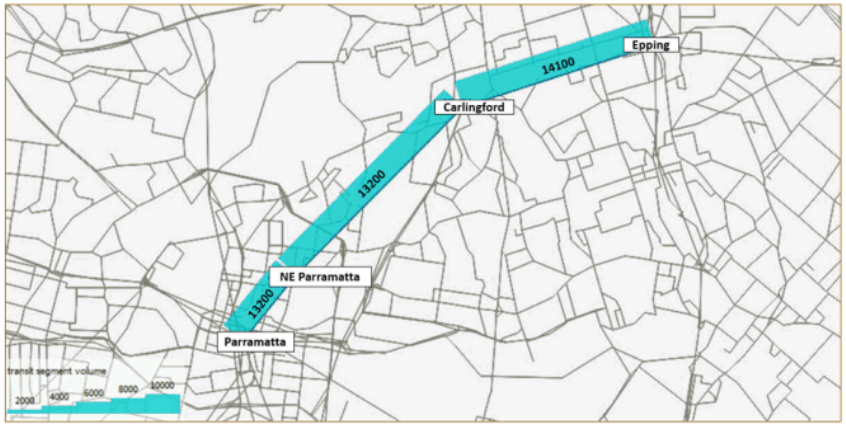


Figure 52: Parramatta to Epping two-hour AM Peak Period Rail Patronage 2056

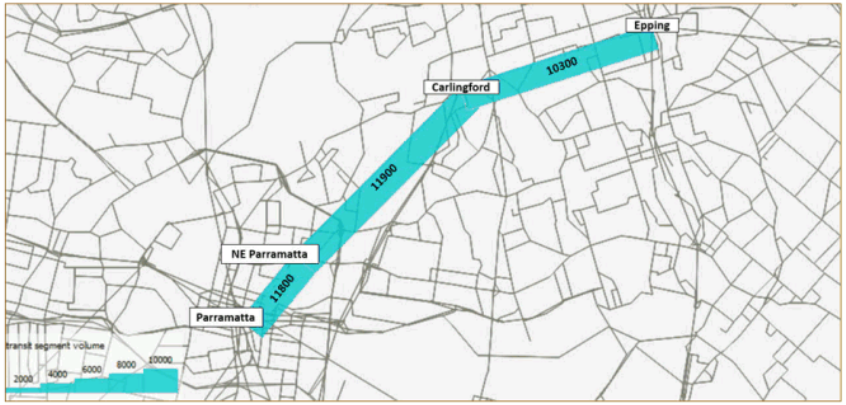


Figure 53: Epping to Parramatta two-hour AM Peak Period Rail Patronage 2056

Parramatta to Kogarah

The Parramatta to Kogarah high capacity mass transit link is approximately 24km long, connecting Parramatta to Kogarah, via Bankstown, with ten stops along the line. The two-hour AM peak boarding and alighting volumes across the indicative station locations between Parramatta and Kogarah is shown in Figure 54. Note, station locations shown are for modelling purposes only and are subject to change.

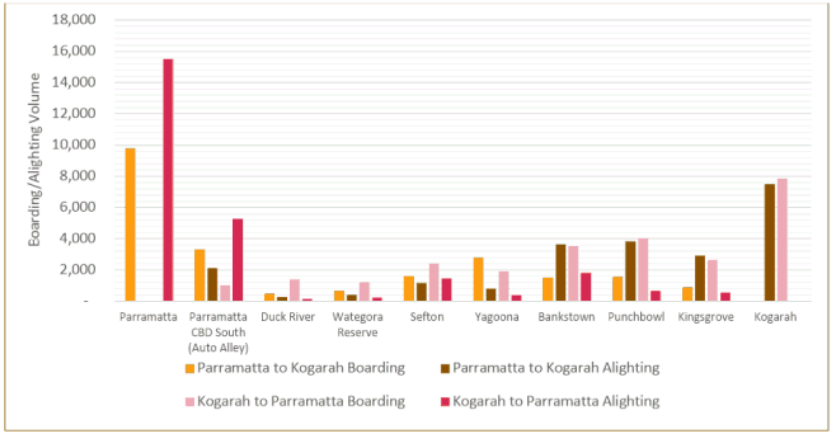


Figure 54: Boarding and Alighting Rail Patronage between Parramatta and Kogarah (2 hour AM Peak)

As shown above, the line from Parramatta to Kogarah is estimated to carry a rail patronage of 22,600 passengers in the two-hour AM peak. The most popular stations to board are at Parramatta, followed by Parramatta CBD South. Short rail trips appear common, with around 2,100 passengers expected to board at Parramatta and alight at Parramatta CBD South (Auto Alley). Stops with high alighting volumes include Kogarah followed by Punchbowl and Bankstown.

The line travelling from Kogarah to Parramatta is estimated to carry a higher rail patronage of 26,000 passengers in the two-hour AM peak. The most popular stations to board are at Kogarah, followed by Punchbowl and Bankstown. Approximately 15,500 passengers are expected to alight at Parramatta CBD, and 5,300 passengers at Parramatta CBD South.

Transit segment volumes of the line are shown in Figure 55 and Figure 56. The STM modelling for Parramatta to Kogarah high capacity train and mass transit links showed that for northbound movements (Kogarah to Parramatta), the highest segment volume was 19,800 passengers between Parramatta CBD South and Duck River. For southbound movements (Parramatta to Kogarah), the highest segment volume was 13,900 passengers between Yagoona and Bankstown.

Assuming a total capacity of 1,150 passengers per metro train, it would be expected that more than 12 services for the southbound direction, and 17 services for the northbound direction across the two-hour AM peak period are required to cater for demand. This equates to a service every 7-10 minutes.

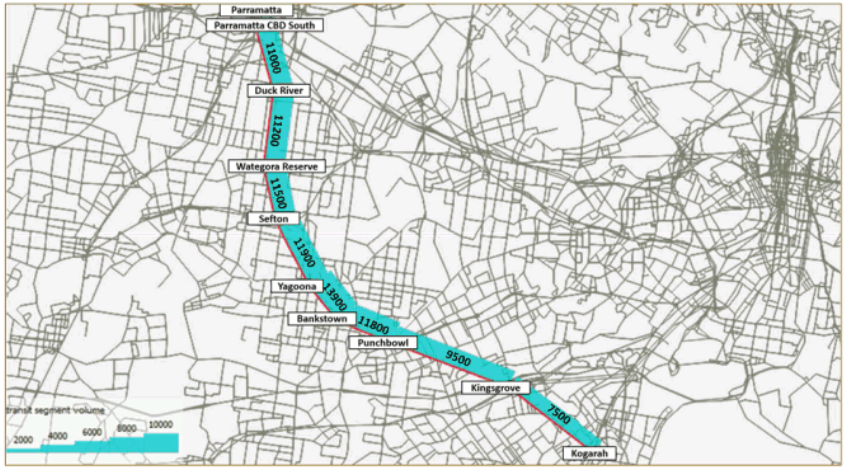


Figure 55: Parramatta to Kogarah two-hour AM Peak Period Rail Patronage

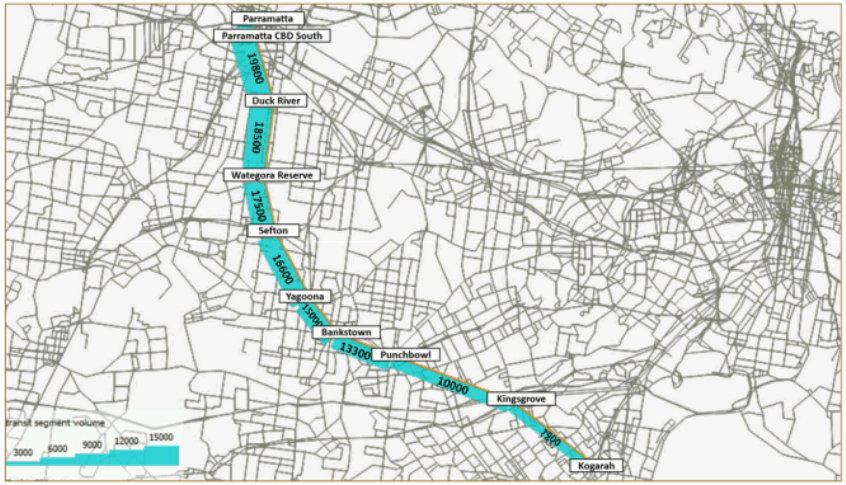


Figure 56: Kogarah to Parramatta two-hour AM Peak Period Rail Patronage

Parramatta to Norwest

The Parramatta to Norwest high capacity train/mass transit is approximately 11km long, connecting Parramatta to Norwest, via Baulkham Hills. The 2056 boarding and alighting volumes across the indicative station locations between Parramatta to Norwest is shown in Figure 57. Note, station locations shown are for modelling purposes only and are subject to change.

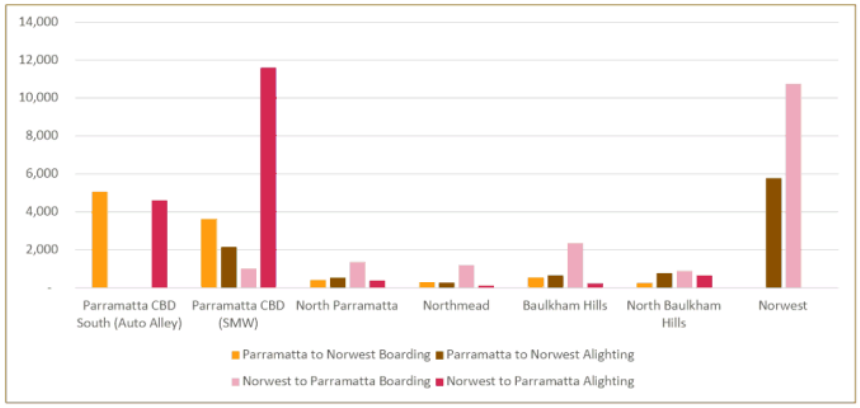


Figure 57: Boarding and Alighting Rail Patronage between Parramatta and Norwest (2 hour AM Peak)

The line from Parramatta to Norwest is estimated to carry a rail patronage of 10,200 passengers in the two-hour AM peak. The most popular stations to board are at Parramatta CBD South, followed by Parramatta CBD (Sydney Metro West). Short rail trips appear to be common, with around 2,200 passengers expected to board at Parramatta CBD South (Auto Alley) and alight at Parramatta CBD (Sydney Metro West). Approximately 5,800 passengers are expected to alight at Norwest.

The line travelling from Norwest to Parramatta is forecast to carry a higher rail patronage of 17,500 passengers in the two-hour AM peak. The most popular stations to board are from Norwest, with around 10,800 passengers, followed by Baulkham Hills with around 2,400 passengers boarding. Approximately 11,600 passengers are expected to alight at Parramatta CBD, and 4,600 passengers to alight at Parramatta CBD South.

Transit segment volumes of the line are shown in Figure 58 and Figure 59. For southbound movements (Norwest to Parramatta), the highest segment volume was 15,200 passengers between North Parramatta and Parramatta CBD. For northbound movements (Parramatta to Norwest), the highest segment volume was 6,500 passengers between Parramatta CBD and North Parramatta.

Based on a total capacity of 1,150 passengers per metro train, it would be expected that more than 13 services for the southbound direction, and 5 services for the northbound direction across the two-hour AM peak period are required to cater for demand. This equates to a service every 9-20 minutes.

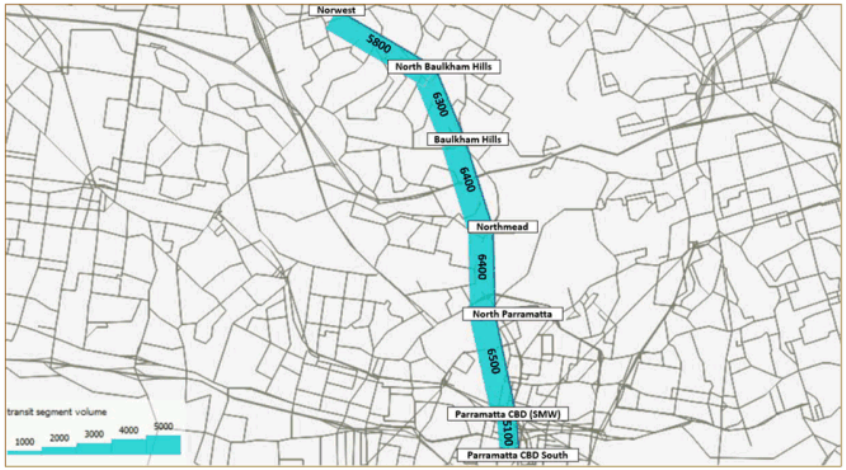


Figure 58: Parramatta to Norwest two-hour AM Peak Period Rail Patronage

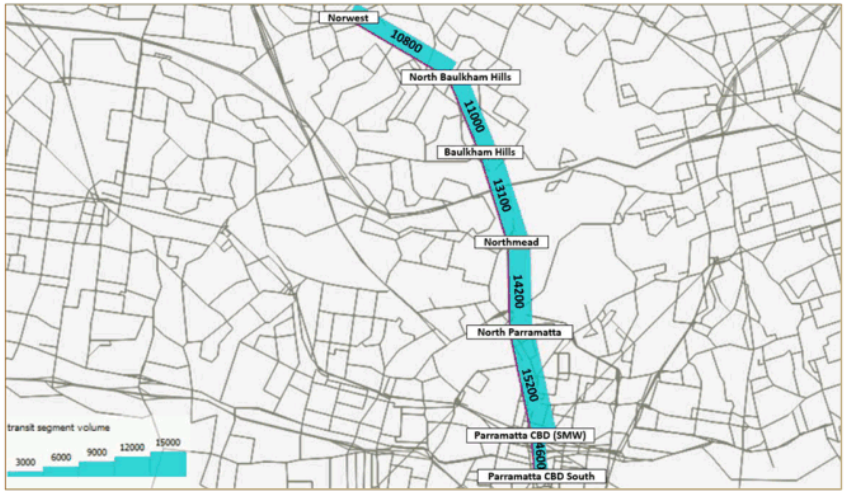


Figure 59: Norwest to Parramatta two-hour AM Peak Period Rail Patronage

Impact on Mode Share

The impact of including the three visionary metro lines on mode split between private vehicle and public transport for people travelling to and from Parramatta CBD was assessed through STM. A comparison of the 2056 full Planning Proposal with the 2056 including the three visionary metro lines is shown in Figure 60.

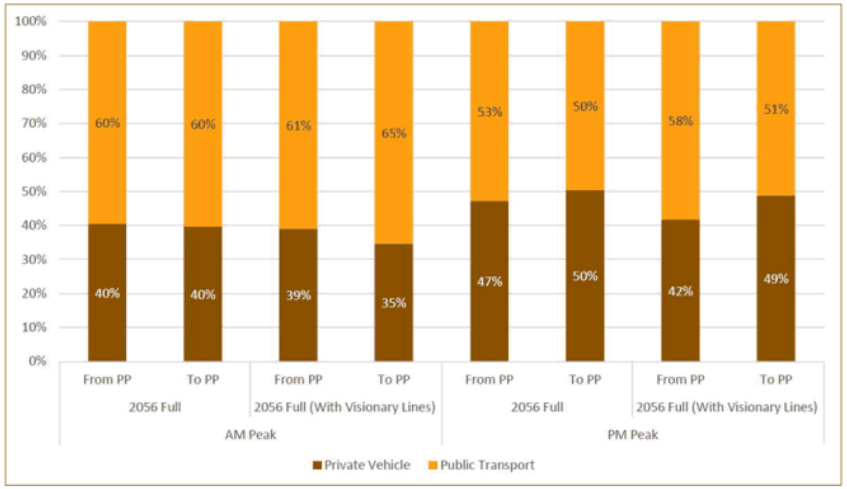


Figure 60: Visionary Lines Mode Share Comparison 2056 Scenario

For the AM peak, the 2056 scenario with the full planning proposal implemented results in a mode share of 60% public transport use and 40% private vehicle for both trips in and out of Parramatta CBD. The inclusion of the visionary lines results in an increase in the proportion of users taking public transport increasing by 5% to 65% to Parramatta CBD. Trips out of Parramatta experience an increase in public transport of 1% only to 61%.

For the PM peak, the 2056 scenario with the full planning proposal implemented results in a mode share of 53% public transport use, 47% private vehicle use out from Parramatta CBD. A 50/50 mode split in public transport and private vehicle use is forecast for trips into Parramatta CBD. With the inclusion of the visionary lines, public transport trip proportions increase by 5% for trips out from Parramatta CBD, and a 1% increase for trips into Parramatta CBD.

The STM analysis shows that the three visionary metro lines can increase the proportion of users taking public transport, by 1-5%. The greatest difference is observed for trips into Parramatta during the AM peak, and out from Parramatta in the PM peak, suggesting the visionary lines will be beneficial to support Parramatta CBD as a major employment hub.

Major increases in mode shift to public transport greater than 5% are not observed in this STM analysis. Reasons that could explain this include:

- The distribution of trips coming into Parramatta is largest from south and southwest of Parramatta, for example Greystanes. The visionary lines do not serve this corridor.
- The modelling has assumed no intensification of population and employment near the future metro stations i.e. transit-orientated developments to draw demand from. Land uses near the metro stations are predominately low-density residential or commercial and insufficient to generate higher demand.
- Regional buses in the STM modelling have not been rerouted or curtailed to avoid competition with the metro lines.
- There are no new feeder buses introduced to serve the new metro stations in the analysis. This limits the size of the metro catchment demand to within walking distances from these stations.

Overall, the visionary metro lines will increase the number of people that can access the Central River City within 30 minutes, supporting jobs growth in Parramatta and help to manage pressure on transport links by spreading demand across the city.

4.4 Peak Hour Car Travel

TfNSW traffic assignment model STFM was used to assign the 2016, 2026 and 2036 STM demand matrices to the road network. The 2026 and 2036 road networks in Parramatta CBD were updated in STFM to include the changes due to the implementation of Stage 1 of Parramatta Light Rail.

4.4.1 AM Peak Period

Changes in the 2-hour link flow as a result of the implementation of the current LEP and with the Parramatta CBD Planning Proposal were assessed in STM analysis. The locations of the counts (gateways) were chosen to be at the major entry and exit points to the Parramatta CBD located mainly on the inner and the outer ring roads around the CBD. Table 15 shows selected roads with the largest change in traffic volumes.

The largest change in traffic volumes occurs between 2016 and 2026 when the existing LEP is assumed to be fully in place and traffic volumes across most locations increase as a result. The implementation of the first stage of Parramatta Light Rail by 2026 would also cause a change in travel pattern with reduction in traffic volumes on Church Street (south of Victoria Road) and increase along the alternative O'Connell St, Marist Place and Wilde Avenue as traffic in the affected part of Church Street re-routes to nearby roads due to new restrictions in Church St.

The impact of the full implementation of the Planning Proposal can be observed from a comparison of partial and full PP in 2036. The greatest impacts are evident within the southern part of the CBD in Church Street which would experience a peak increase of 740 vehicles over 2 hours in the northbound direction and Great Western Highway 520 in the eastbound direction. These changes are significantly lower than those as a result of the full implementation of the current LEP in 2026 and increase in traffic associated with new developments.

The impact of the current LEP on the outer ring road is greatest at James Ruse Drive at Hassall Street where 2-hour traffic volumes increase by 1080 vehicles. In comparison, the change in traffic flows due to the full planning proposal is negligible with little change in traffic flows along the outer ring road.

2-hour Volume to Capacity ratios (VC) are also summarised. The implementation of Stage 1 of Parramatta Light Rail would result in a high VC ratio for southbound traffic in Marist Place in 2026. VC ratios also increase in Church Street north of M4 ramp and Marsden Street North of Great Western Highway which consistently shows high volumes across all scenario years. Public transport, such as buses, should be considered for high VC routes to fit more customers into the available road space.

Table 15: Volume Differences and Volume Capacity Ratios 7-9am (Source: STFM)

Location	2026 Base – 2016	2026 Partial – 2026 Base	2036 Full – 2036 Partial	2016	2026 Base	2026 Partial PP	2036 Partial PP	2036 Full PP
	Volume Difference			Volume Capacity Ratios				
Inner Ring Roads								
O'Connell St (south of Victoria Rd)								
Northbound	130	60	-130	0.5	0.6	0.6	0.7	0.6
Southbound	1010	290	410	0.6	0.8	0.8	0.9	0.9
Marist Place (south of Victoria Rd)								
Northbound	50	30	190	0.2	0.3	0.3	0.3	0.5
Southbound	1090	-10	110	0.4	1.3	1.3	1.4	1.5
Church St (south of Victoria Rd)								
Northbound	-580	20	100	0.2	0.1	0.1	0.1	0.2
Southbound	NA	NA	NA	0.3	NA	NA	NA	NA
Wilde St (south of Victoria Rd)								
Northbound	120	70	50	0.3	0.3	0.3	0.3	0.4
Southbound	1420	210	160	0.3	0.8	0.8	0.9	0.9
Church St (north of M4 off-ramp)								
Northbound	800	120	740	0.8	0.9	1.0	1.0	1.2
Southbound	580	90	300	0.5	0.6	0.6	0.6	0.7
Marsden St (north of GWH)								
Northbound	150	130	280	1.2	1.3	1.4	1.5	1.7
Southbound	220	60	320	0.1	0.2	0.2	0.2	0.4
Great Western Hwy (west of Church St)								
Eastbound	530	160	520	0.5	0.6	0.6	0.7	0.8
Westbound	430	110	440	0.4	0.5	0.5	0.6	0.6
O'Connell St (north of Macquarie St)								
Northbound	-830	-50	-110	0.8	0.7	0.7	0.7	0.7
Southbound	1330	320	530	0.6	0.8	0.9	0.9	1.0
Outer Ring Roads								
James Ruse Drive (north of Hassall St)								
Northbound	690	140	200	0.6	0.7	0.7	0.8	0.9
Southbound	1080	30	150	0.6	0.8	0.8	0.9	0.9

4.4.2 PM Peak Period

Table 16 shows the changes in the 2-hour link flows for the evening peak period for the considered scenarios. The change in traffic volumes across all of the gateway locations due to the implementation of the current LEP is almost double that would be experienced under the full planning proposal in 2036. Under the full PP, the largest impacts would occur in Church St north of M4, Cambridge Avenue at the rail crossing and Great Western Highway west of Church Street. Both O'Connell and Pitt streets would also experience increase in traffic north of the Great Western Highway under the full PP. The largest impact on the outer ring road occurs in 2026 when the current LEP is assumed to be fully in place. The full PP appears to result in minor increase in traffic volumes when compared to their carrying capacity.

Table 27 below shows the volume capacity ratios. Major increases in volume capacity ratios across all locations occurs between 2016 and 2026 when the current LEP is realised. The main congested links are Marsden Street, O'Connell Street north of Great Western Highway and Church Street near M4 ramp where the volume-capacity ratios progressively increase across the scenarios to 2036.

Due to the full planning proposal, the highest impact is on Church Street (north of M4 ramp) in the AM peak period and on O'Connell Street (north of Great Western Highway) in the PM peak period.

Table 16: Volume Differences and Volume Capacity Ratios 4-6pm (Source: STFM)

Location	2026 Base – 2016	2026 Partial – 2026 Base	2036 Full – 2036 Partial	2016	2026 Base	2026 Partial PP	2036 Partial PP	2036 Full PP
	Volume Difference			Volume Capacity Ratios				
Inner Ring Roads								
Cambridge St (at rail crossing)								
Eastbound	270	90	420	0.5	0.6	0.6	0.7	0.9
Westbound	470	-30	270	0.5	0.7	0.7	0.8	0.9
Church St (north of M4 off-ramp)								
Northbound	520	100	620	0.6	0.7	0.7	0.8	0.9
Southbound	790	130	740	0.7	0.9	0.9	1.0	1.1
Great Western Hwy (west of Church St)								
Eastbound	460	190	500	0.6	0.6	0.7	0.7	0.9
Westbound	690	160	190	0.5	0.7	0.7	0.7	0.8
O'Connell St (north of GWH)								
Northbound	NA	NA	NA	NA	NA	NA	NA	NA
Southbound	800	220	870	0.9	1.0	1.1	1.1	1.3
Pitt St (north of GWH)								
Northbound	800	110	540	0.4	0.6	0.6	0.6	0.7
Southbound	NA	NA	NA	NA	NA	NA	NA	NA
Marsden St (north of GWH)								
Northbound	310	90	160	1.0	1.2	1.2	1.3	1.4
Southbound	310	120	190	0.4	0.6	0.6	0.7	0.8
O'Connell St (north of GWH)								
Northbound	NA	NA	NA	NA	NA	NA	NA	NA
Southbound	800	220	870	0.9	1.0	1.1	1.1	1.3

4.5 Mesoscopic Analysis

The Greater Parramatta and Olympic Model (GPOP) Aimsun model developed for Parramatta Light Rail was used to cordon off a subarea covering the Parramatta ITP study area. The model has been used to identify the travel route of vehicles based on the level of congestion and delay in the network for the near term 2026 future year scenario to test the impact of the partial planning proposal on travel pattern and changes to Council's off-street parking rates.

The 2016 Base Case model was developed from the existing Aimsun model used for *Stage 1 Parramatta Light Rail (PLR),* which covers a wider geographical and temporal scope. The model covers a region bordered by the outer ring road around the Parramatta CBD, which includes James Ruse Drive, the M4 Motorway and Cumberland Highway. It covers the morning (7-9am) and evening (4-6pm) weekday peak periods.

The future year 2026 model was developed from the base year Parramatta CBD Aimsun model, using STM/STFM growth, committed infrastructure projects, and associated public transport service changes. The most significant difference between the 2016 base and 2026 Aimsun networks is Stage 1 of the Parramatta Light Rail (PLR) preferred network, with its enabling works along George Street, O'Connell Street and key intersections on Church Street.

This model represents full development of the existing Parramatta Local Environmental Plan, permanent adoption of the current interim parking controls, and known site-specific planning proposals under the Planning Proposal ("Partial PP").

4.5.1 Demand adjustment for parking supply constraints

For some years, the City of Parramatta endorsed interim parking rates from the City of Sydney LEP controls. It is anticipated that these rates will be formally adopted as part of the Planning Proposal (PP). As such, they are included in the 2026 base Aimsun modelling. The relatively small amount of additional trip reductions due to parking constraints could be considered to shift to public transport modes. These constraints are not reflected in the demands from the STM/STFM.

The impact on forecast growth has been calculated based on the change in parking rates for office/commercial developments, the percentage contribution of office/commercial employment to total employment in the Planning Proposal area, and the contribution of trips to STFM totals.

The resulting factors are shown in Table 17. These factors are applied to the new trips, added since the base year, travelling to or from the Planning Proposal area.

Table 17: Growth adjustment factors for parking controls

To/From	AM Peak	PM Peak
To Planning Proposal Area Zones	73%	58%
From Planning Proposal Area Zones	52%	86%

4.5.2 Future Year Demands

Future year demand matrices are based on cordon matrices from the STM and STFM modelling. In addition to the parking supply constraints, demand adjustments include the following:

- **Active Transport:** Car traffic making short trips within the model has been reduced to reflect the attractiveness of active transport modes (walking and cycling). For origin to destination distances 2km or less, 30% of car trips have been assigned to active modes. The proportion then declines linearly by distance, reaching 0% at 5km.
- **Public Transport:** Parramatta transport strategy target a 40% car mode share for work related trips in the area. To scale car trips down (which is currently 43%) to the target, the additional shift of trips from car demands is considered to be taken up by public transport.
- **Peak Spreading:** Peak spreading has been applied resulting in a flat profile across both modelled two hour periods and 5% diversion of PM peak traffic to shoulder periods.

4.5.3 2026 Future Base Case Network Performance

The overall performance of the network in the 2026 base case is summarised by the graphs in Figure 61 and Figure 62. Figure 61 shows the number of vehicles travelling within the model area (in blue) and the number which have attempted to start their journey but have not been able to enter the network (in orange). Figure 62 shows the average speed within the modelled network (in blue) and the average density in vehicles per lane kilometre (in orange).

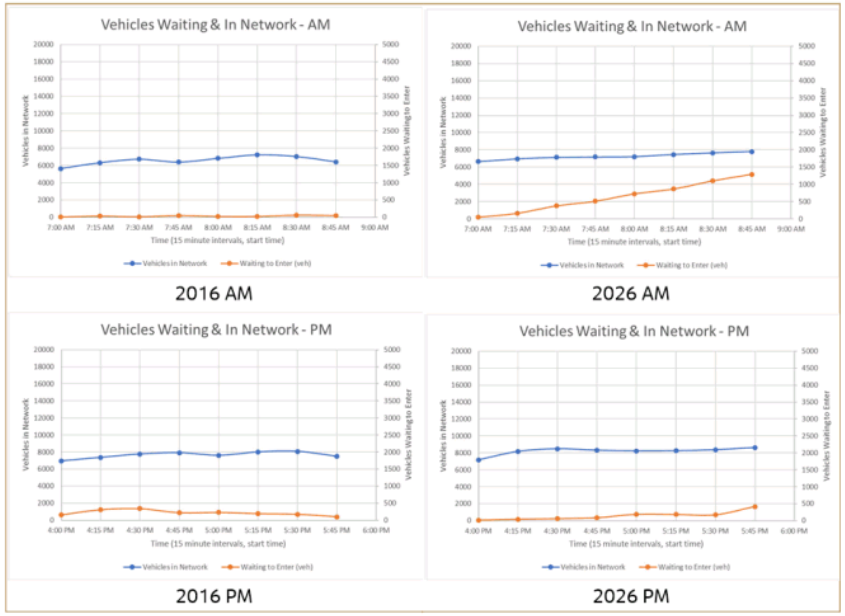


Figure 61: Overall Network Performance – Waiting and Travelling Vehicles

The plots show that in the 2026 AM peak, there is an increased number of vehicles which have attempted to start their journey, but have not been able to enter the network, also known as 'unreleased demand'. This excess demand is queued outside the model and only released when sufficient road space is available. At this stage, the traffic throughput for a road section would be constrained by road capacity. During the AM, these capacity constraints are predominantly located at the M4 eastbound entry. In the 2026 PM peak, the number of vehicles waiting to enter the network is relatively low. This suggests the road network has sufficient capacity to cater for the number of vehicles in the network. The numbers of vehicles in the network are reasonably stable in both peaks with the 2026 results slightly higher than the 2016 figures, as expected.

The network density and speed graphs in Figure 62 echo the waiting and travelling vehicle results. The 2026 performance in both peaks is similar to the base year, with only slightly lower average speeds and slightly higher densities. Both show similar declines in average speed during the modelled period in 2016 and 2026, and reasonably stable average speeds. By the end of the modelled period, average travel speeds across the network in 2026 are approximately 2% lower in 2026 than in 2016, in both peaks.

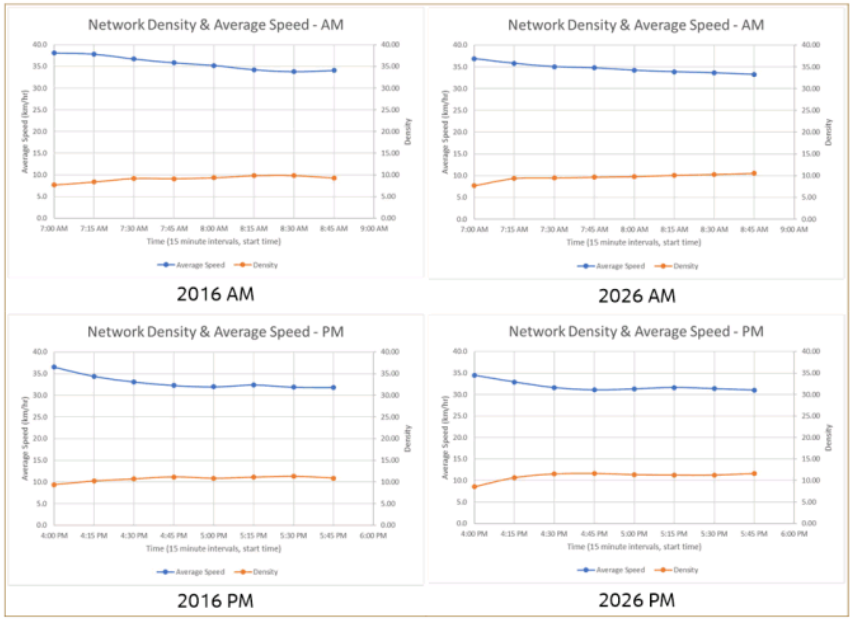


Figure 62: Overall network performance – network density and speed

4.5.4 2026 Future Base Congestion

The geographic distribution of congestion is shown by density, simulated delay and simulated speed plots. The maximum AM and PM peak densities are shown in Figure 63 and Figure 64. Other density, simulated delay and simulated speed plots are outlined in Appendix B.

The density plots reinforce the findings of the vehicle number and speed graphs, showing similar overall performance in the two years, with congestion in 2026 being slightly higher than 2016 and with some differences in distribution.

In the 2026 AM peak, increased congestion is observed on Cumberland Highway, M4 eastbound at the western boundary of the model, and on several side streets along the north side of the Great Western Highway east of Pitt Street and along the north side of Parkes Street. Increased delays and slower speeds are observed at these locations. Increased delays are also observed to the north of Parramatta along Church Street. Compared to 2016 AM, capacity increases have removed congestion on the eastern section of the M4, while Jersey Road northbound has also improved.

In the 2026 PM peak, increased congestion is observed on James Ruse Drive and Windsor Road approaching the Cumberland Highway, on the Great Western Highway around Mays Hill, on the M4 eastbound model entry and westbound Parramatta Road on ramp, and at scattered locations around the CBD. Increased delays and slower speeds are observed at these locations. Increased delays are also observed to the north of Parramatta along Church Street. Similar to the AM peak, the eastern M4 has improved, as has the area around the Church Street interchange (except for the Parramatta Road on ramp itself), due to the planned works there.

Total two-hour peak demand increases by 4% in the AM peak period, and remains very similar in the PM peak, in this scenario. The results indicate that the final 2026 base case model accommodates the demand with a reasonable degree of congestion, higher than the base year but without widespread queue propagation cutting off throughput.

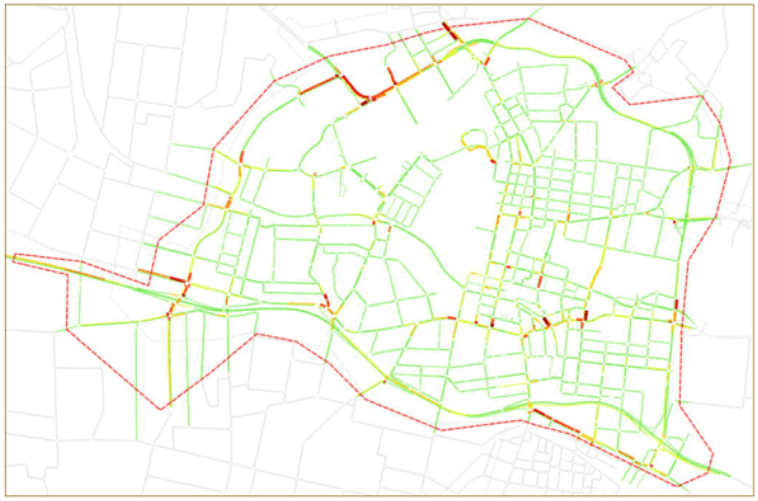


Figure 63: 2026 Density plot, AM 2 hour peak maximum

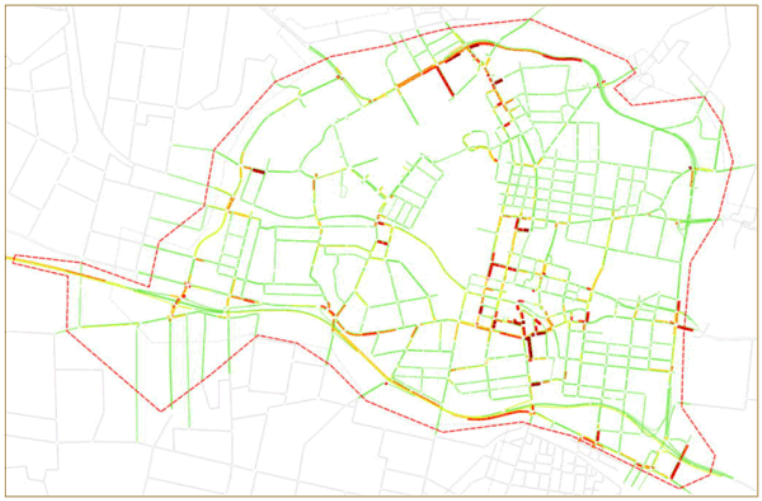


Figure 64: 2026 Density plot, PM 2 hour peak maximum

4.6 Mode Share Sensitivity Analysis

Mode share sensitivity analysis was undertaken for Parramatta CBD to better understand the needs of Parramatta into the future. Analysis was based on the previously discussed Aimsun and STM results, with demand adjustments included. These demand adjustments account for factors which haven't been considered within the initial modelling results, and by incorporating them, provide a better reflection of the expected network performance.

4.6.1 Parking Supply Sensitivity Analysis

A sensitivity analysis to explore the implications of a reduction in parking supply has been undertaken. Demand adjustments to reduce parking supply have been applied on the initial STM results. A comparison of the JTW Car Mode Share for STM Without Adjustment, and With Parking Restriction adjustments applied are shown for AM and PM peaks, in Figure 65 and Figure 66. Within both graphs, the benchmark of 40% has been marked to indicate the 40% Journey to Work (JTW) car mode share target outlined in Parramatta CBD transport strategy,

During the 2-hour AM peak, if the reduction in parking supply is considered as per the proposed parking rates, the JTW car mode share across the scenarios are shown to reduce. Car mode share is expected to reach the 40% target by 2056 if the parking restriction is applied. Travel from the Planning Proposal in the AM peak is expected to reach the 40% target by 2036 if the Full LEP is implemented.

During the 2-hour PM peak, , if the reduction in parking supply is considered as per the proposed parking rates, the JTW car mode share across the scenarios are shown to reduce. However, the reduction in car mode share is not significant enough to reach the 40% target in any of the future scenarios.

These results highlight that additional improvements to Parramatta on top of the committed projects included in the STM modelling and parking supply restrictions are needed to achieve lower car mode share.

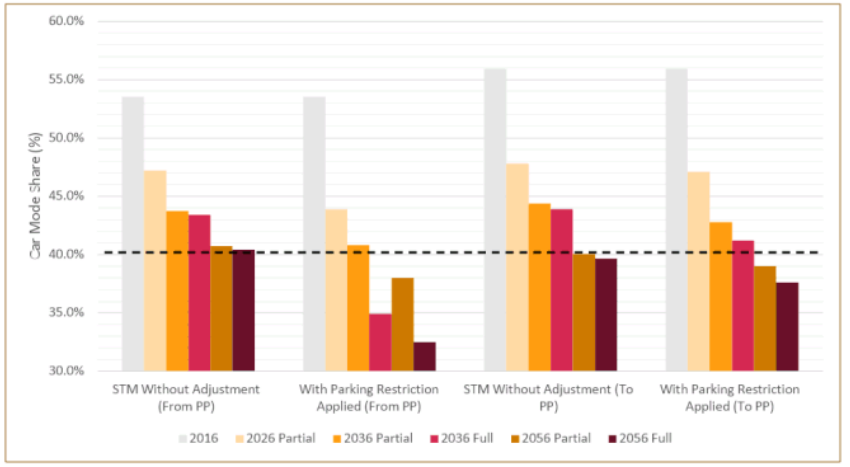


Figure 65: Car Mode Share Comparison to Account for Reduction in Parking Supply (2 hour AM Peak)

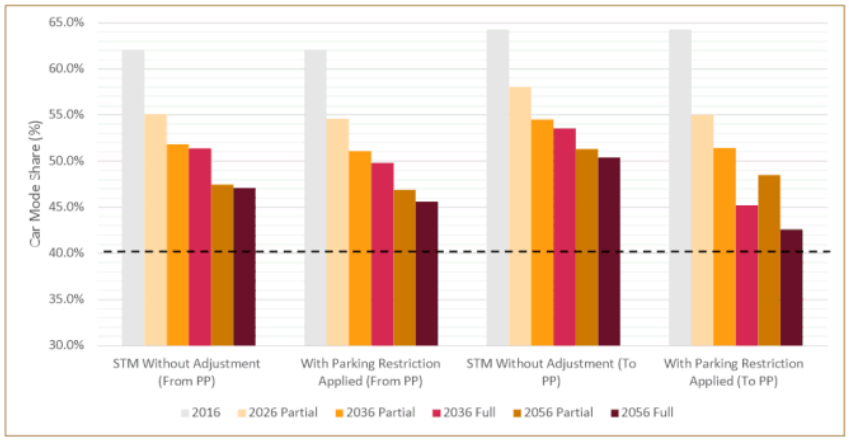


Figure 66: Car Mode Share Comparison to Account for Reduction in Parking Supply (2 hour PM Peak)

4.6.2 Implications of Transport Vision for Future Mode Share

A sensitivity test was carried out to explore the implications of the further development of the Planning Proposal area to full development in 2026 and 2036. For the purposes of this investigation, four scenarios were considered for a nominal 2036 future year:

- **2036 Partial Case** (Planning Policy Car Demands as per 2026 Partial Case)
- **2036 Full Case A** (Planning Policy Car Demands as per 2026 Partial Case)
- **2036 Full Case B** (Planning Policy Car Demands 20% higher than Case A)
- **2036 Full Case C** (Planning Policy Car Demands 20% lower than Case A)

Demand adjustments made as part of the sensitivity testing include:

- **Walk/Cycle Mode Shift:** 30% of car trips were removed for areas with a distance less than or equal to 2km and converted to walk trips. A further decreasing proportion of car trips were removed as cycle trips up to 5km. No trips longer than 5km were removed. This demand adjustment was applied across the entire model for internal trips only.
- **Planning Area Parking Policy Changes:** Adjustments were made to the original trip rates for the planning area zones (i.e. not additive to the walking and cycling reductions). Where the reduced trip rates resulted in less trips than the previously calculated walking and cycling adjustment, the origins or destinations from the walk/cycle mode shift adjustment were reduced (factored) to the new total. These additional reductions in car trips were assumed to shift to public transport as the walk/cycle shifts had already been taken.
- **Additional shift to match Parramatta CBD planned mode share:** After demand adjustments were made as described above, a further shift of car trips was made to reduce the work car mode share to the vision target of 40%. This small remaining shift is considered to be influenced by the vast improvement in public transport and an active mode connectivity that is required to support the vision and the increase in road congestion that would occur in parallel.
- **Flatten flow profile over 2 hour peak periods:** This demand adjustment flattens the flow profile over 2 hour peak periods, where all 15 minute periods in each 2 hour assignment period were changed to the average 15 minute flow for the 2 hour period
- **Split demand into WestConnex (M4) Toll and non-Toll Vehicles**
- **Spread demands outside two-hour peak periods:** The demand matrices from the steps above resulted in revised demand matrices for assignment within Aimsun. While the models were close to performing adequately, a minor amount of peak spreading was required, implemented by factoring the entire demand by the AM factor in the AM peak and PM factor in the PM peak.

The resulting planning area peaks (combined AM and PM) trip demands are tabulated in Table 18.

Scenario	Total Peak Demands	Base 2016	Base 2036	Adj 1	Adj 2	Adj 3	Relative to 2016
2026 Partial Case	Walk/Cycle	16,700	33,600	52,400	52,400	52,400	315%
	Public Transport	26,000	55,400	55,400	59,100	66,600	256%
	Car Mode Share	65%	59%	50%	48%	45%	
	Car Mode Share - Work	59%	52%	45%	43%	40%	
	Cars	57,800	90,800	77,400	74,700	69,400	120%
	Trucks	10	120	120	120	120	
	Heavy Trucks	10	10	10	10	10	
2036 Partial Case	Walk/Cycle	16,700	38,700	65,300	65,300	65,300	392%
	Public Transport	26,000	63,000	63,000	65,200	71,000	273%
	Car Mode Share	65%	56%	45%	44%	42%	
	Car Mode Share - Work	59%	48%	40%	39%	37%	
	Cars	57,800	94,100	75,100	73,500	69,400	120%
	Trucks	10	120	120	120	120	
	Heavy Trucks	10	40	40	40	40	
2036 Full Case A	Walk/Cycle	16,700	45,300	77,800	77,800	77,800	467%
	Public Transport	26,000	73,400	73,400	77,300	98,200	377%
	Car Mode Share	65%	57%	45%	43%	36%	
	Car Mode Share - Work	59%	48%	40%	39%	32%	
	Cars	57,800	110,300	87,100	84,300	69,400	120%
	Trucks	10	260	260	260	260	
	Heavy Trucks	10	30	30	30	30	
2036 Full Case B	Walk/Cycle	16,700	45,300	77,800	77,800	77,800	467%
	Public Transport	26,000	73,400	73,400	77,300	77,300	297%
	Car Mode Share	65%	57%	45%	43%	43%	
	Car Mode Share - Work	59%	48%	40%	39%	39%	
	Cars	57,800	110,300	87,100	84,300	84,300	146%
	Trucks	10	260	260	260	260	
	Heavy Trucks	10	30	30	30	30	
2036 Full Case C	Walk/Cycle	16,700	45,300	77,800	77,800	77,800	467%
	Public Transport	26,000	73,400	73,400	77,300	117,700	452%
	Car Mode Share	65%	57%	45%	43%	28%	
	Car Mode Share - Work	59%	48%	40%	39%	25%	
	Cars	57,800	110,300	87,100	84,300	55,500	96%
	Trucks	10	260	260	260	260	
	Heavy Trucks	10	30	30	30	30	

Notes: Rounded to nearest 10 and 100 trips

Table 18: 2026 and 2036 Partial Case Transport Demand

The performance of the model for the 2026 Partial scenario indicates that the Parramatta CBD road network is close to it's practical carrying capacity. The Partial case modelled in Aimsun assumes that other transport modes would carry the increased future transport demand. This will result in walking and cycling demands increasing by 3.2 fold 2016 level and public transport demands to 2.6 times 2016 level by 2026

Observations that can be made from the sensitivity testing of transport demands in the Planning Proposal area in 2036 include:

- Even if the land use in the planning area was only to allow increases that are within the current LEP and the 2036 Partial Case, this will result in significant further increases in the walking/cycling and public transport demands.
- If the full Planning Proposal were to occur walking and cycling demands would increase to 4.7 times 2016 levels and public transport demands to 3.8 times 2016 levels by 2036.
- Even if an additional 20% capacity could be squeezed from the road network, the walking/cycling demands would remain at 4.7 times 2016 levels but public transport demands would be 3.0 times 2016 levels by 2036.
- The implication of this level of demand increase due to walking/cycling and public transport demands would necessitate taking away road space from the road network and, therefore reducing car capacity. Assuming a 20% drop in car demand, public transport demands would be required to be 4.5 times 2016 levels by 2036 to accommodate for the demand. Walking/cycling demands would remain at 4.7 times 2016 levels. The scenario described has been illustrated in Figure 67.

The observations demonstrate that with the additional land use within Parramatta CBD, the road network will not be able to cope with the traffic demand. Further traffic could be accommodated only through significant road infrastructure projects which is not consistent with the transport vision for Parramatta. To accommodate the increase in personal travel to Parramatta CBD, the active and public transport facilities will need to carry the travel demand over and above that which can practically be catered for as road traffic.

Additionally, some existing road space will need to be reallocated to cater for buses and walking/cycling modes such as footpath widenings and bus priority lanes. This will result in a drop in maximum road capacity. Large investment in public transport and walking/cycling improvements within Parramatta will be required to cater for the increased demands as the population shifts away from car mode share as the dominant transport mode.

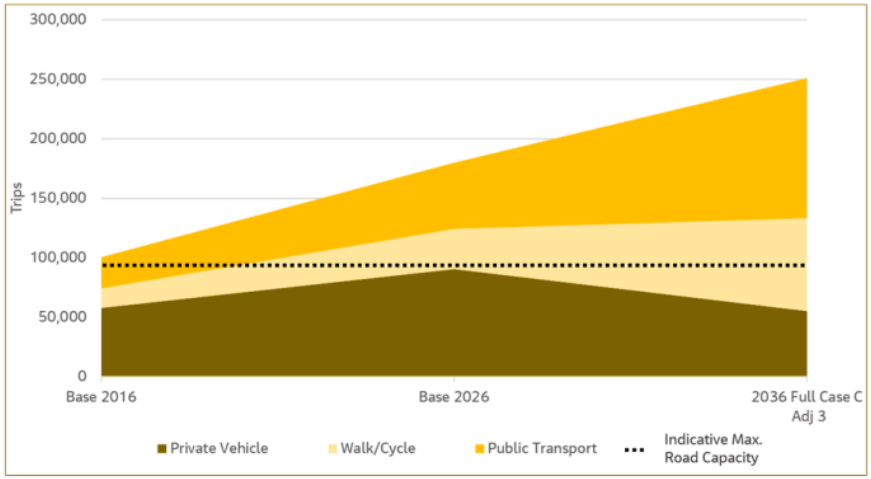


Figure 67: Mode share shift observed for 2036 Full Case C – Adjustment 3.

5.0 Parramatta Future

There are significant challenges ahead for Parramatta to maintain and enhance its transport system, including meeting the increasing demand for services, as well as new trips from a growing population.

This chapter identifies the principles that will guide future plans and committed projects, then summarises future transport networks for each mode and the context within which they will operate. It has been informed from the transport modelling undertaken as part of preparing this ITP.

5.1 Forecast Travel Trends

This ITP explores forecast travel trends of Parramatta's future across a 40 year period from 2016-2056 in terms of population growth, origin and destination patterns, land use, and mode share.

5.1.1 Resident and Worker Population Growth

The City of Parramatta is one of Australia's leading regions, with population growing at twice the pace of broader Australia. Land use forecasts are shown in Figure 68. As shown, employment and population are expected to more than double in the next 40 years. This will result in more journey to work and leisure trips in and out of Parramatta CBD.

Figure 68: Parramatta CBD Land Use Forecasts (Source: City of Parramatta)

The Greater Parramatta and Olympic Peninsula Place-based Infrastructure Compact Pilot (GPOP PIC) forecast that over the next 20 years and with the right city-shaping infrastructure, GPOP could potentially generate around 100,000 jobs to add to the 150,000 jobs it has today. GPOP's capacity for further employment and dwelling growth both influences and is influenced by transport capacity in the region.

5.1.2 Origin and destination patterns

The forecast changes in the spatial distribution of trips accessing Parramatta CBD from 2016 to 2056 were assessed in the *Parramatta CBD Strategic Transport Study* and are outlined in Figure 69 and Figure 70. The changes are based on forecast land use changes.

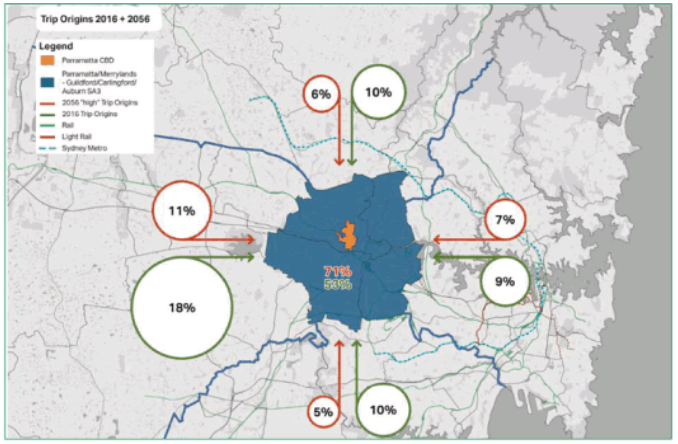


Figure 69: Forecast trip origin distribution patterns – AM Peak (Source: Parramatta CBD STS)

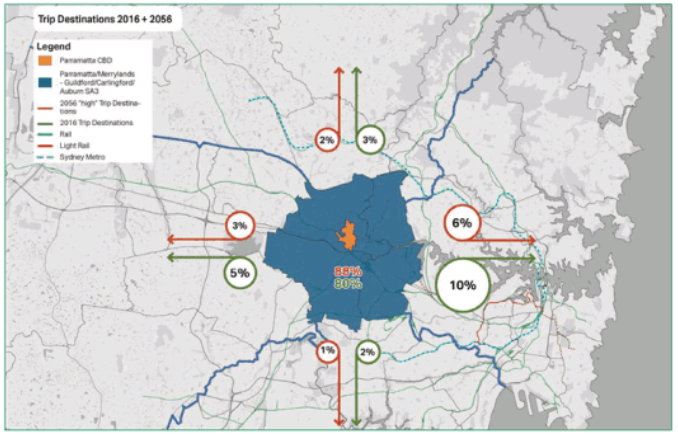


Figure 70: Forecast trip destination patterns – AM two hour peak (Source: Parramatta CBD STS)

The trends indicate that the proportion of shorter trips within Parramatta will increase significantly between 2016 and 2056. This is an outcome of the proposed significant residential development of the Parramatta CBD, and proposed densification of nearby precincts such as Parramatta North and Camelia as homes are provided closer to jobs. The increase in short distance trips create opportunities for shift from using private vehicle to active transport. In both 2016 and 2056, areas to the west of Parramatta are expected to continue to be the main external original of trips, while areas to the east are forecast to provide the main destinations.

The transformation of Parramatta will provide new challenges in the associated transport task, driven by planned large increases in both residential population and jobs.

5.1.3 Land Use Forecasts

The Parramatta CBD Planning Proposal has a strong focus to increase the size and density of the commercial core, continuing to generate demand to the CBD. It aims to create non-residential floor space in mixed use developments on the margins of the CBD that could serve as both trip origin and demand generators, potentially altering the existing travel patterns around the CBD.

The proposed changes in Parramatta CBD land uses are shown in Figure 71. When compared to Parramatta CBD's existing land use, it becomes clear that the commercial core of Parramatta CBD has expanded significantly to the south of the Parramatta rail line, along Church Street and Valentine Avenue. With the updated CBD boundaries, there is no residential land use within the Parramatta CBD. Most areas within Parramatta CBD are mixed use (B4) offering a combination of business, office, residential, and retail spaces. The expansion and consequent increases in both commercial and residential floor space would allow Parramatta CBD to accommodate more jobs and residents.

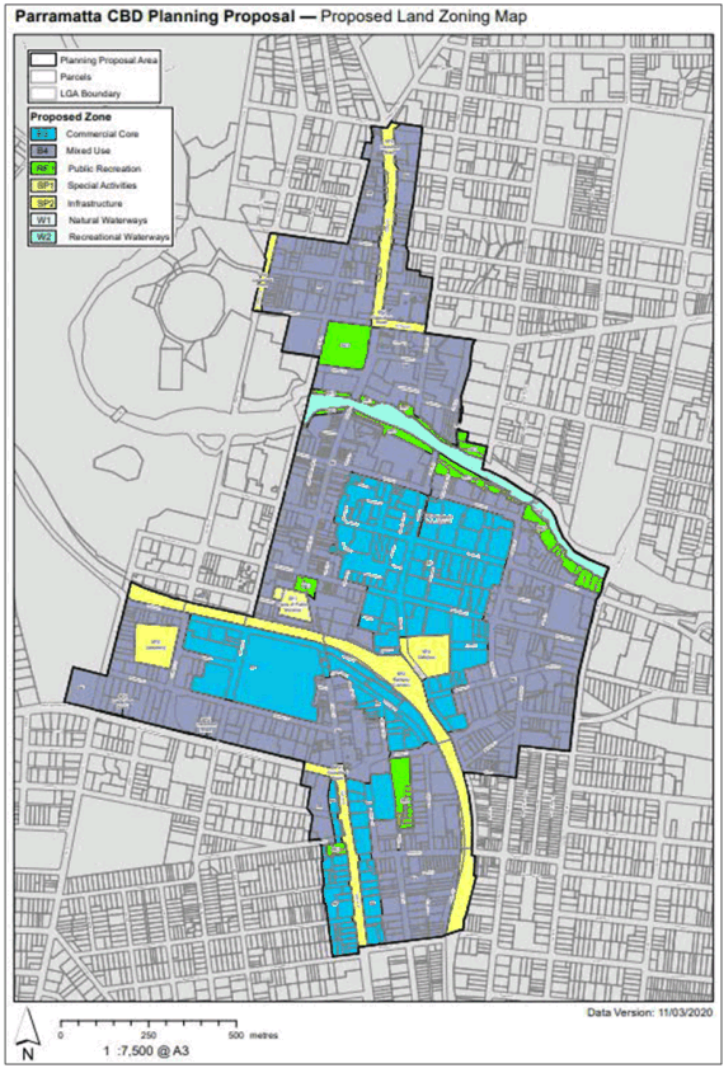


Figure 71: Proposed Parramatta CBD Land Use

5.2 Strategic Direction

The Integrated Transport Plan strategic direction is framed by the three geographic settings which provide the context for consideration of Parramatta CBD's transport future at different scales. The main themes of the Parramatta CBD ITP are described below.

The city's 'second CBD'

In the context of Greater Sydney, Parramatta CBD is the city's 'second CBD'. Increasing jobs and other measures of local economic activity within Parramatta CBD requires the scale of urban development across Parramatta CBD to keep pace with the level of investment in Parramatta Light Rail and Sydney Metro West. This means that when a business is making a locational decision, they should consider Parramatta CBD as a place able to offer amenities and infrastructure as attractive as Sydney CBD, for their workers, clients and suppliers to travel to and move around.

Greater Parramatta: the core of the Central River City

Those living midway between Parramatta CBD and Sydney CBD should have the option of looking westwards for jobs, entertainment, shopping, tertiary education and all personal and business services expected of a city centre. Moreover, the Central River City should be positioned to enjoy the added advantage of its own growing catchment to the north, south and west. Maximising Parramatta CBD's attraction of workers and visitors from across this catchment means upgrading and creating new transit links that minimise the burden of travel time and unreliable road-based access for personal travel. As each sustainable transport improvement is put in place, measures need to be introduced to reduce the provision of parking and competition with public transport, while protecting and enhancing service access to businesses.

An interconnected Parramatta

Parramatta CBD strives to be a place where people want to live and work. Parramatta CBD should be strongly interconnected with its surrounding precincts that people can move around the area as one vibrant urban quarter. The light rail is one important step in achieving this but does not end there. To enjoy interesting streets, build exercise into their daily routines or simply make short trips not served by transit, the build environment of Parramatta needs to aim to offer its residents and workers the same opportunities to be able to walk or ride at the same level as those in eastern Sydney. To make space for this, and for the constant flow of goods and services moving between the Regional Ring Roads and Parramatta CBD, the private car needs to gradually play a subsidiary role to free up space for public and active transport and commercial vehicles.

5.2.1 Mobility as a Service

Central to all three themes is the idea of the 'MaaS opportunity'. Mobility as a Service (MaaS) refers to a service model that enables customers to plan and pay for their journeys using a range of services via a single customer interface. It has the potential to enable customers to access integrated, easy-to-understand journeys in a broad market of transport services. As technology improves, it is expected that its business model will play greater role in integrating services into fewer journeys for travellers making trips at every scale to and from Parramatta CBD.

5.2.2 Movement and Place Framework

Transport for NSW (TfNSW) and the Government Architect NSW have collaboratively developed the Movement and Place Framework to provide a cohesive approach to balancing the movement of people and goods with the amenity and quality of places, contributing to the aim of providing more attractive, sustainable and successful cities and places. The concept aims to improve the liveability of places through an integrated land use and transport planning tool, that sets customer focused outcomes and delivers wider benefits for the health and wellbeing of the community.

Figure 72 shows how place intensity and movement help to classify roads and street into different types of street environments. The guide offers four types of street environments, shown in Figure 72 and described below:

- **Civic spaces** are streets at the heart of communities and have significant places for street life and transport. They are often in major centres, tourist and leisure destinations and community hubs. These streets are often pedestrian priority, shared spaces.
- **Local streets** often have important local place qualities. Activity levels are less intense; however, these streets can have significant meaning for local people.
- **Main streets** have both significant movement functions and place qualities.
- **Main roads** are routes central to the efficient movement of people and freight. They include motorways, primary freight corridors, major public transport routes, the principal bicycle network and key urban pedestrian corridors. Place activity levels are less intense; however, these roads and routes can have significant meaning to local people.

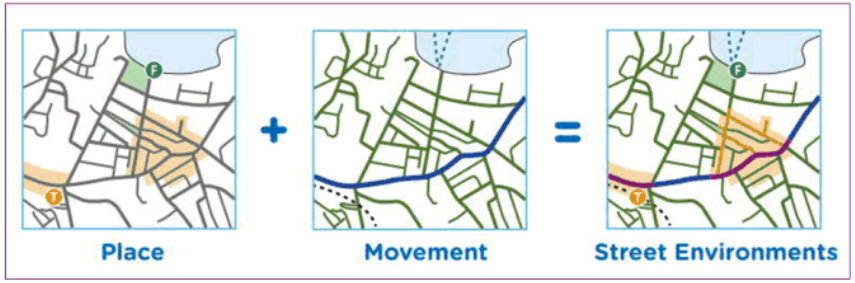


Figure 72: Street Environments, Movement and Place (Source: Future Transport Strategy 2056)

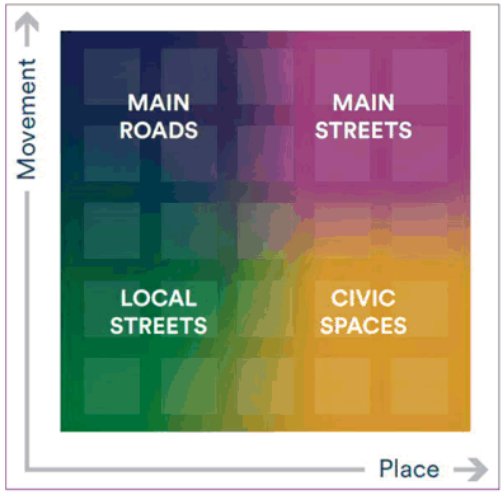


Figure 73: Analysing combinations of Movement and Place (Source: Practitioners Guide to Movement and Place 2020)

As the transformation of Greater Parramatta to become the heart of Central River City continues, invariably there will be changes to the function of some streets that would necessitate to create more places for people and support vibrant streets whilst retaining movement corridors to support the economic growth of the city. The network within Parramatta CBD will need to gradually evolve to support streets of Parramatta CBD as places for people that should increasingly rely on sustainable transport modes for growth and not building more roads to support its growth. The Framework has been used to inform the directions outlined in this chapter.

5.2.3 Mode Share

A set of mode share targets were developed in the *Parramatta CBD Strategy Transport Study,* that transition along with the planned intensification of the Parramatta CBD and transport response and interventions. One of the key mode share targets outlined is to decrease journey to work car mode share to 40% by 2036 under the full Planning Proposal.

Strategic level modelling indicates that future land use and transport changes will result in a general trend of re-moding of travel away from the car as the city becomes more compact. To achieve the 40% work car mode share target by 2036, a gradual shift would not be sufficient to achieve this target and greater intervention would be required to shift car trips to public transport and active modes.

The STM sensitivity testing of transport demands in the Planning Proposal area for 2036 showed that if the full Planning Proposal were to occur, there will be 4.7 times more walking and cycling compared to 2016 level and public transport usage will increase to 3.8 times for the same period.

To cater for such large-scale increases in walking/cycling and public transport demands, it would require taking away space that is currently used by road traffic, which would result in an increase in road congestion. To avoid complete saturation of the road network under future conditions, a reduction in the role of the private vehicle, increased uptake of sustainable transport and optimised use of space will be necessary. There will be a need to ensure public transport and walking/cycling improvements are able to cater for the increased demands as the population shifts away from car mode share as the dominant transport mode.

5.2.4 Multi-modal Network

Future transport network planning would need to be considered in a multimodal sense. For example, the bus interchange on Argyle Street adjacent to the Parramatta Rail Station facilitates transfer between bus and heavy rail as well as pedestrian access to the rest of the CBD. However, due to competition for space the interchange and its surrounding experiences congestion for both pedestrians and bus users.

Further growth expected in Parramatta will place greater pressure on both the public transport and surrounding road network. Figure 74 provides an illustration to show the number of people that can travel down one lane within a one-hour period if different modes of transport are used. It is clear that modes such as walking, cycling and public transport can carry many times more people than the private vehicle which occupies the equivalent amount of space.

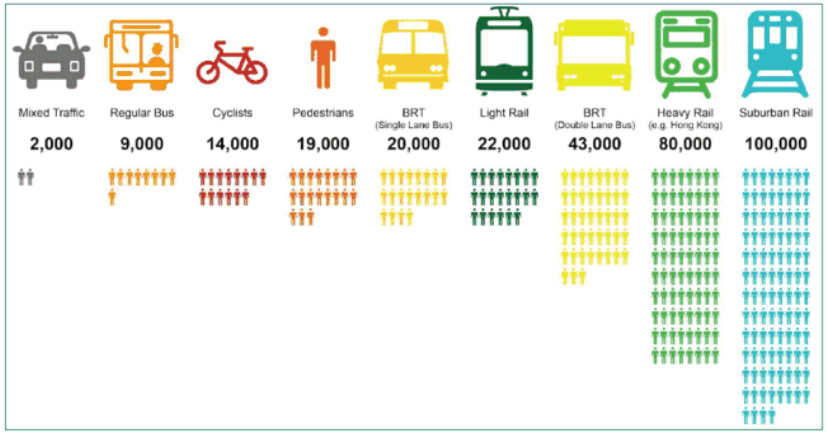


Figure 74: Carrying Capacity of Different Modes, for one 3.5m lane per hour (Source: Parramatta Bike Plan 2017, United Nations)

Despite being one of the least space efficient modes, private vehicles continue to be a major mode of travel for work and other purposes in Parramatta. Increase in car traffic with its associated noise and safety impacts would adversely affect the walking and cycling amenity of Parramatta's streets. Added congestion on the road network would further slow buses, reduce their reliability and attractiveness of public transport. It is therefore crucial to manage the roads to discourage increases in traffic so to allow alternative modes of travel to be promoted. With the predicted increase in population and employment, the efficient use of road space becomes ever more critical.

The construction of the Parramatta Light Rail once completed will improve connectivity both from outside but also within the CBD by providing easy and fast access to light rail stops in Macquarie Street, the Parramatta Square development and the proposed Civic Link giving access to the future Museum of Applied Arts and Sciences on the river. Parramatta Light Rail also provides opportunities to implement a multi-modal transport system with interchange opportunities with rail and bus services near the Parramatta station. This will also facilitate mobility and movements of people between the inner and the outer core of Parramatta, significantly changing how travellers choose to travel in Parramatta.

To this end there needs to be more people than today walking and bike-riding within the 5km catchment that takes in precincts within the Parramatta Outer Ring Road boundary. Beyond this distance, bike-riders can take advantage of the river and creek-based green corridors that cross the Parramatta catchment. Demand-responsive bus, minibus and point-to-point services are able to fill in network gaps. Freeing up the road space would allow goods delivery and servicing operations to run more efficiently around the clock as it fits into the major city.

5.2.5 Land Reservation Acquisition

The draft Land Reservation Acquisition (LRA) Maps, shown in Figure 75 and Figure 76, have been proposed to be amended to reflect road widening to identify the following:

- Strategic opportunities to improve capacity and capability of the existing road network, having regard to the significant growth within the Parramatta CBD as well as inherent existing constraints such as heritage and existing significant development
- Opportunities to improve public transport capability through localised intersection improvements and augmentation of existing bus lanes
- Opportunities for a regional cycleway network within the Parramatta CBD
- Opportunities to improve pedestrian safety and capacity

Consistent with the actions in the adopted Parramatta CBD Planning Strategy, new streets and lanes through large blocks are proposed. These will deliver a more permeable road and pedestrian network in the precinct.

It is noted that constraints of land ownership, heritage and incremental redevelopment patterns within the city centre can impact the delivery timeframes and quality of public domain. LRAs can have significant implications for the built form as the city develops, so are best utilised where consolidated outcomes can be achieved. All LRAs are to be tested to ensure that it is only retained where required.

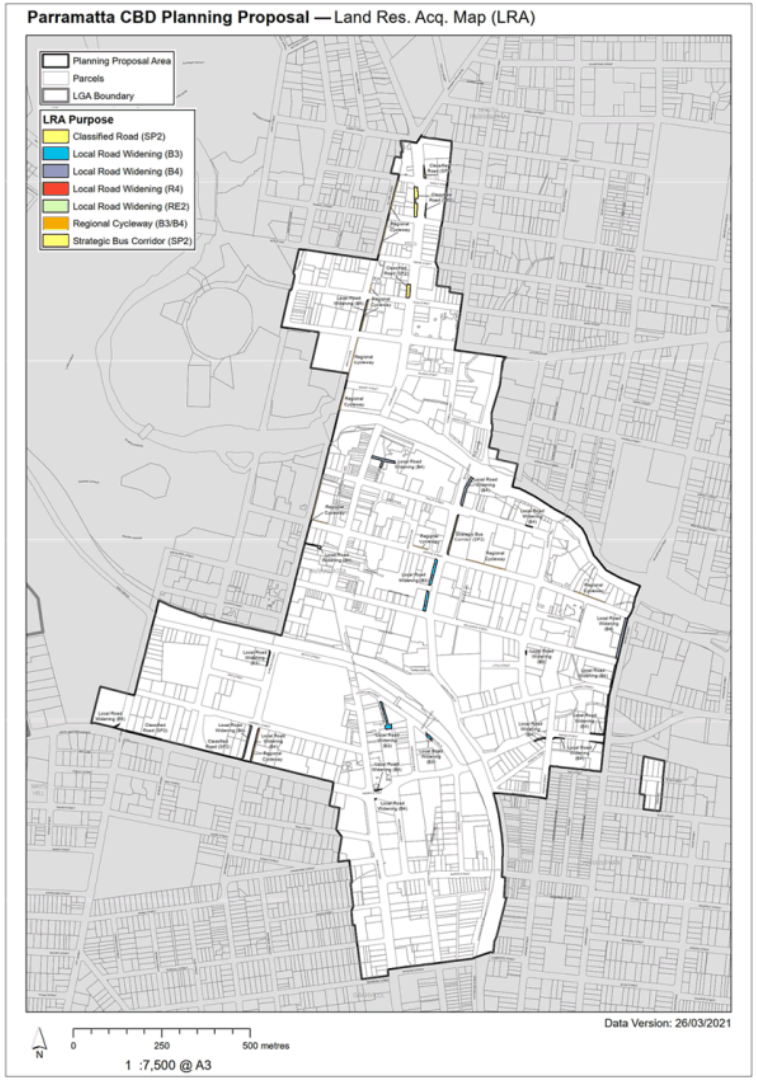


Figure 75: Planning Proposal – Land Reservation Acquisition Purpose Map (Source: CoP Planning Proposal)

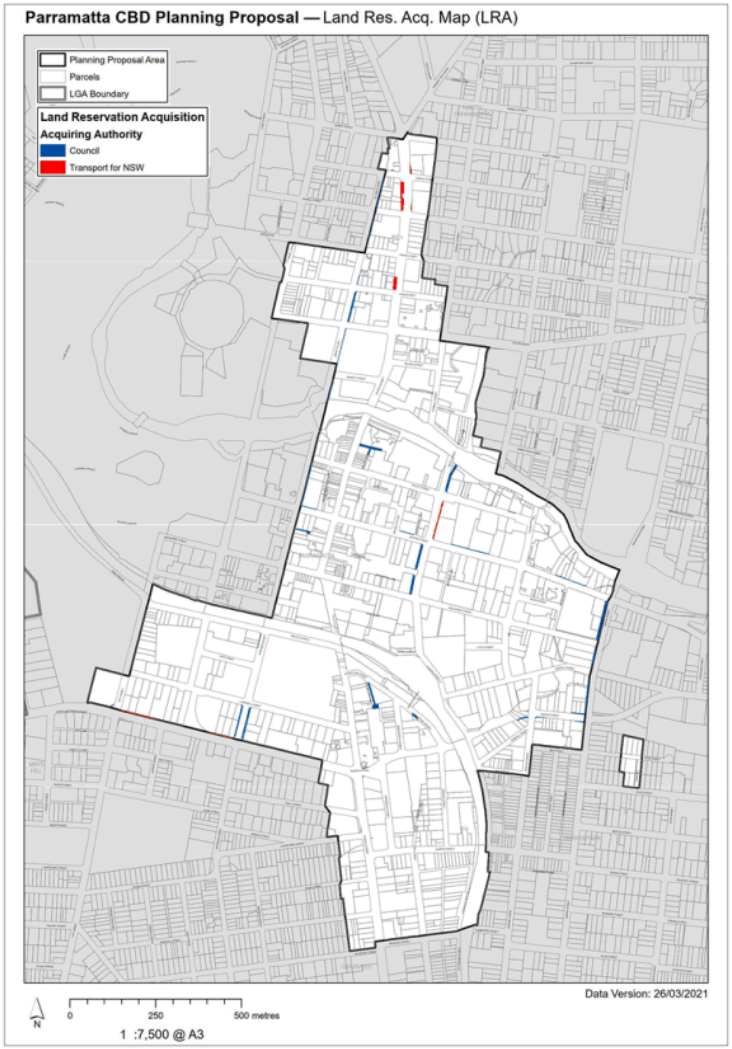


Figure 76: Planning Proposal – Land Reservation Acquisition Acquiring Authority (Source: CoP Planning Proposal)

LRA testing was conducted on a number of locations as shown in Figure 77, and the results are summarised in Table 19.

High level concept plans have been developed by Council to test the LRA for the Marsden Street Cycleway and George Street Cycleway. These plans are for discussion purposes only and can be found in Appendix C and D. All setting out of facilities and measurements are indicative only and subject to confirmation, further design testing and consultation.

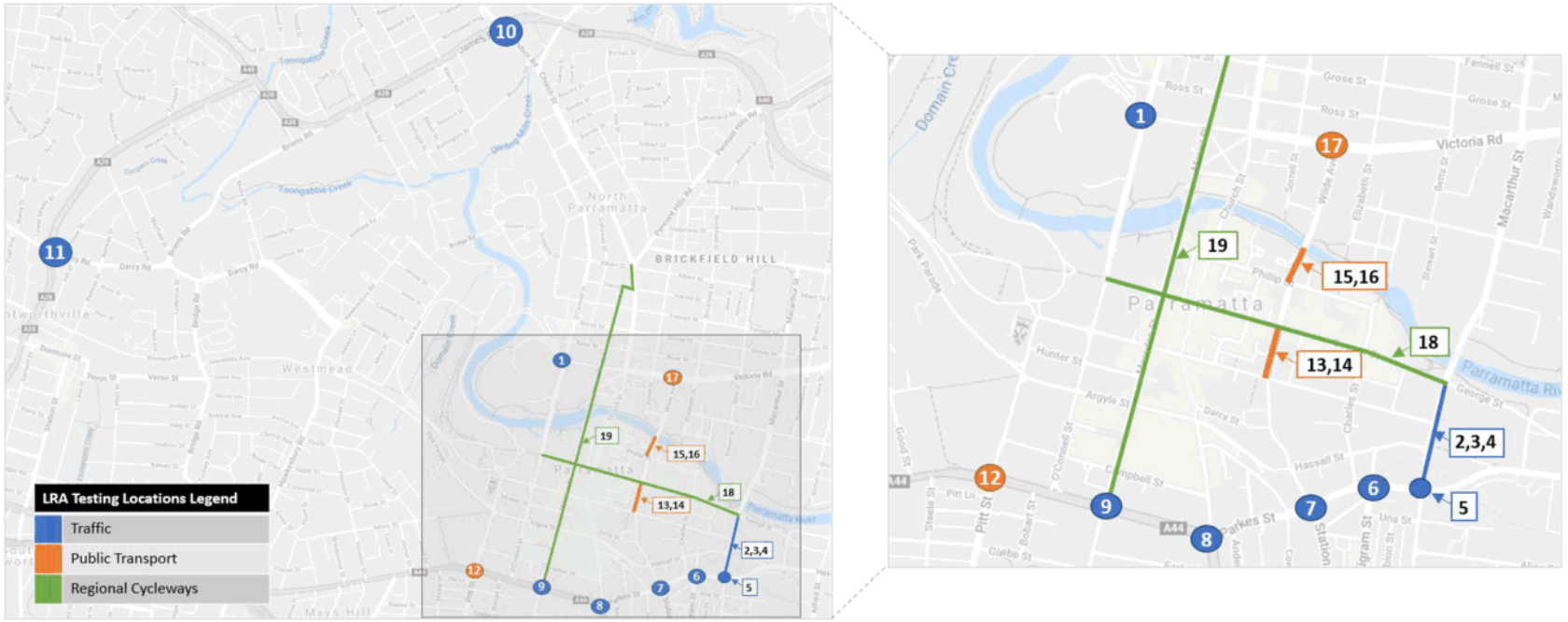


Figure 77: LRA testing locations

Table 19: Results of LRA testing

No	Location	Proposal	Action	Notes
			Traffic	
1	O'Connell St / Victoria Rd	O'Connell Street southern approach, dual northbound right turn lanes into Victoria Road.	Remove LRA	Widening into Government owned land could be done in future if traffic conditions warrant. Concerns there is not enough available space on Victoria Road to receive dual right turn due to heritage and schools.
2	Harris St between George St and Parkes St	Harris Street southern approach, additional through and left turn lane on southern approach for duplication of Gasworks Bridge to the west.	Retain LRA	Significant improvement to performance of George Street intersection with bridge duplication. Widening between Macquarie Street and Hassall Street allows for two clear southbound lanes. Widening between Hassall Street and Parkes Street allows
3		Harris Street northern approach, southbound right turn bay into Hassall.	Retain LRA	

No	Location	Proposal	Action	Notes
4		Harris Street northern approach, southbound right turn bay, combined right turn and through, through and left into Parkes Street.	Retain LRA	for additional lane that can be allocated to right, through or left as traffic volumes increase.
5	Parkes St at Harris St	Eastbound left or right turn bay, westbound left turn bay.	Retain LRA	Turn bays in Parkes Street on approach to Harris Street improve performance by allowing for two through lanes, so turning traffic or pedestrians do not hold up through movement.
6	Parkes St / Wigram St	Parkes Street western approach, eastbound right turn bay into Wigram Street.	Retain LRA	Improvement to performance through removing right turn from through lanes.
7	Parkes St / Station St E	Initial test of potential one-way pair of Station Street East northbound and Wigram Street/Charles Street southbound	Continue investigation	Does not require LRA but does require ongoing testing of circulation through the AIMSUN model. Other one-way systems could also be tested to improve efficiency of circulation and at targeted intersections.
8	Great Western Hwy / Parkes St / Church St	Parkes eastern approach, westbound left turn bay into Church.	Retain LRA	Westbound left turn has a dedicated left turn, ensuring through movement is not held up by pedestrians crossing southern leg of intersection.
9	Great Western Hwy / Marsden St	Marsden northern approach, southbound left turn into GWH, northbound left turn bay into Westfield, widening for pedestrians and cyclists.	Retain LRA	Southbound left turn bay configuration makes greatest improvement to intersection performance. Northbound additional lane reduces weaving on approach to Campbell Street, improving safety.
10	James Ruse Dr / Windsor Rd	Eastbound offramp, additional lane.	No LRA required (in CBD boundary)	Improvement in intersection performance warrants the additional lane that is currently being captured in a Site Specific Planning Proposal at that site.
11	Cumberland Hwy (Hart Dr) / Darcy Rd	Darcy Road eastern approach, westbound left turn bay into Cumberland Highway.	Propose LRA southern side of Darcy St (was outside of PP boundary)	Improves intersection performance therefore proposing an LRA in that location is supported as part of future work.
		Public Transport		
12	Great Western Hwy / Pitt St	GWH western approach, splay to allow eastbound buses to turn left into Pitt alongside general traffic left turn.	Retain LRA	Increases "green time" available to eastbound buses tenfold.
13	Smith between George and Macquarie (west)	Bus pull in bays with increased pedestrian space	Retain LRA	Proposed LRA allows for increased pedestrian space and indented bus bays to facilitate interchange between new Metro West stop and buses. Future design for facilities in this location must take into consideration impacts and appropriate treatment to heritage items including the underground Convict Drain which passes through the site.
14	Smith between George and Macquarie (east)	Bus pull in bays with increased pedestrian space	Remove LRA	Proposed LRA does not have enough space, and future LRA would need to be wider and proposed along with any future bus planning.
15	Smith north of Phillip (west)	Bus pull in bays with increased pedestrian space	Remove LRA	MAAS development precludes any future widening.
16	Smith north of Phillip (east)	Additional structure for northern approach, southbound extended right turn bay, through lanes traffic and bus, left turn bay.	Retain LRA	Has potential to improve intersection performance and requires additional testing including a clear direction from TfNSW on bus requirements.
17	Wilde Ave / Victoria Rd	Widening for additional southbound bus lane or dual northbound right turn into Victoria	Remove LRA	Recent upgrades of bus lane have improved public transport performance, traffic upgrade not needed as intersection performs well and in the future.
		Regional Cycleways		
18	George St	To test fit cycle path on either northern, southern, or both sides.	Remove LRA southern side Retain LRA in 4 locations northern side	Cycle path on northern side only is the most space efficient. LRA only required on northern side to provide adequate space for pedestrians at bus stops (if cycle path is delivered in the future).

No	Location	Proposal	Action	Notes
				Future design for facilities in this location must take into consideration impacts and appropriate treatment to heritage items including the underground Convict Drain which passes through the site.
19	Marsden St	To test fit cycle path on either eastern or western side.	Remove LRA on east side of Marsden St between George St and Campbell St Retain all other areas	LRA north of River allows parking to be retained both sides. Adequate space within road reserve in CBD to fit cycle path with targeted shifting of kerbs (kerbs can be retained "as is" if traffic circulation can be reviewed). LRA allows for cycle path to cross over Great Western Highway (two potential scenarios dependant on development patterns).

5.3 Committed Projects

At the core of Parramatta's transformation are the following committed projects which influence Parramatta's transport network. This section describes the key projects that are expected to shape Parramatta and how we travel.

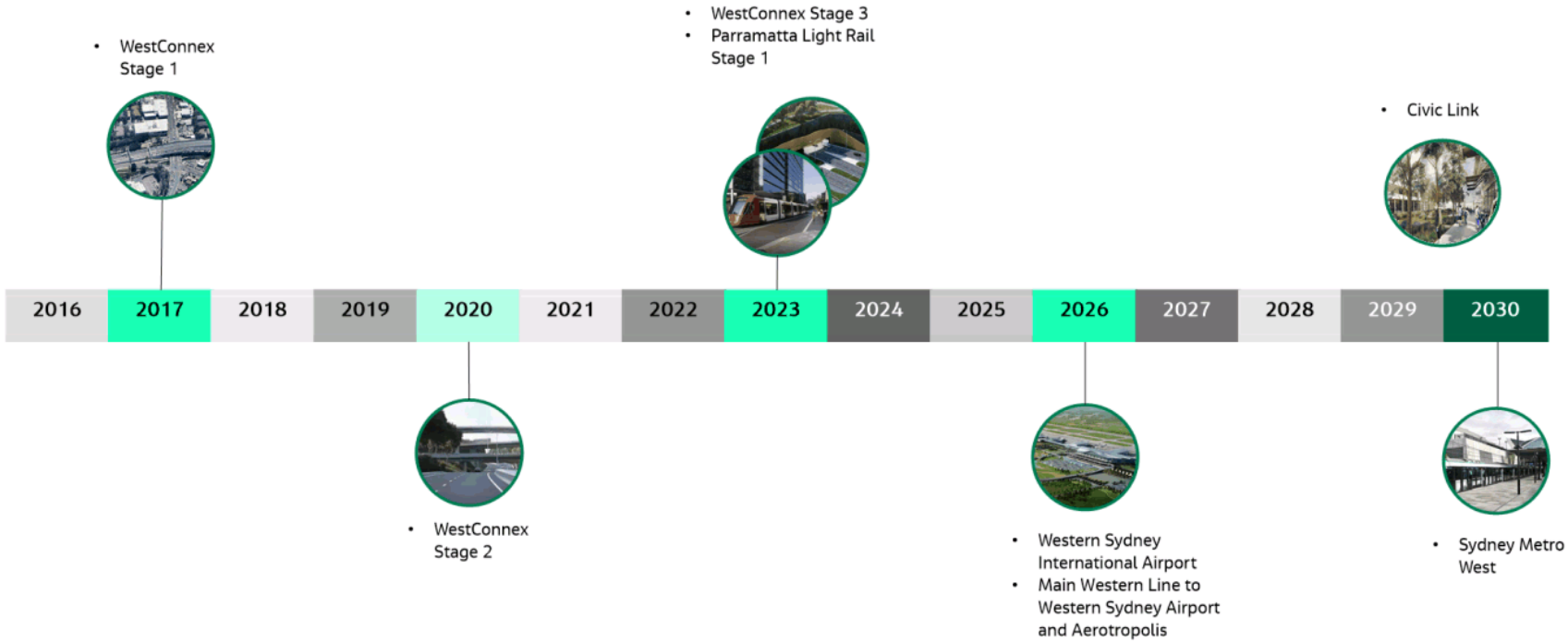


Figure 78: Expected Completion Dates for Committed Projects

5.3.1 WestConnex

WestConnex is a 33-kilometre motorway linking Parramatta and Sydney's south west with the Sydney CBD, Sydney Airport and Port Botany. It is comprised of three stages:

- Stage 1 consists of the New M4 Tunnels and M4 Widening, which included 5.5km tunnels and around 7.5km of surface roads. The WestConnex M4 links to the M4 at Parramatta in the west, and Wattle Street and Parramatta Road at Haberfield to the east. It reduces travel time and improves reliability of the M4 near Greater Parramatta and access across Sydney for commercial traffic.
- Stage 2 consists of constructing the M8, which provides motorists with a 9km traffic-light free link between Kingsgrove and St Peters.
- Stage 3 consists of constructing the M4-M5 Link Tunnels which connect the New M4 at Haberfield and the new M5 at St Peters.

All three stages are programmed to be operational by 2023. Figure 79 shows the stages and how they complete Sydney's orbital network.

Figure 79: WestConnex Route Map

When the WestConnex is completed, it will remove bottlenecks, relieve congestion and improve the speed, reliability and safety of travel across Sydney.

5.3.2 Parramatta Light Rail – Stage 1

Parramatta Light Rail Stage 1 is currently under construction, with services scheduled to start in 2023. The 12km two-way track being installed in Stage 1 connects Westmead to Carlingford via the Parramatta CBD, with an estimated 130,000 people living within walking distance of one of the 16 stops by 2026. Stops include Westmead Health Precinct, Parramatta North Precinct, Bank West Stadium, The new Powerhouse Museum (MAAS) and Riverside Theatres Cultural Hub, Private and social housing redevelopment at Telopea, Rosehill Gardens Racecourse and three western Sydney University campuses.

Figure 80: Parramatta Light Rail Stage 1 (Source: Parramatta Light Rail)

5.3.3 Western Sydney International Airport

Western Sydney International (Nancy-Bird Walton) Airport, located in Badgerys Creek, has been committed by the Australian Government. The airport is expected to be open by 2026.

5.3.4 Sydney Metro West

Sydney Metro West provides a turn-up-and-go metro rail service that would support Greater Parramatta, Sydney Olympic Park, the Bays and the Eastern Harbour City. Currently in detailed planning, this new rail link will relieve pressure on the T1 Western Link by creating a service separate from the network.

Figure 81: Proposed route for Sydney Metro West (Source: Sydney Metro)

5.3.5 Civic Link

The Civic Link will be a green, pedestrianised public space and cultural spine that connects public life from the heart of Parramatta CBD to the River.

The proposed Civic Link extends across four city blocks through the heart of the Parramatta CBD, connecting Parramatta Square and the transport interchange to River Square, the Museum of Applied Arts and Sciences (MAAS), and the broader foreshore precinct.

5.3.6 Other Committed Transport Projects

Other committed transport projects that are expected to influence Parramatta's transport network are described in Table 20.

Table 20: Committed Transport Projects

Projects	Mode	Description
Bus Priority Infrastructure Program	Bus	The Bus Priority Infrastructure Program is a 10 year rolling program of targeted initiatives that will invest in bus priority infrastructure in key transport corridors through the program.
Sydney Clearway Strategy	Road	The NSW Government is acting to reduce congestion and delays on Sydney's roads by installing new and extended clearways
Parramatta Congestion Improvement Program	Road	A $30 million program of road works to reduce congestion around the area, by upgrading key intersections to improve access to Parramatta CBD, for example: • The intersections of Pitt Street and Marsden Street along the Great Western Highway • The Woodville Road, Parramatta Road and Church Street intersection at Granville
M4 Smart Motorway	Road	The M4 Smart Motorway project will use the latest technology to monitor traffic conditions and smooth the flow of traffic on the M4 corridor by making the most of available road space. Scheduled for operation by 2020, this will be the first Smart Motorway in NSW
Road Network Planning areas	Road	Road Network Plans outline the Government's 20-year plan to manage development of road corridors to improve safety, efficiency and sustainability. Planning is expected to include state roads in and around Parramatta, particularly along the inner and outer ring roads.
SCATS Congestion Improvement Program	Road	The NSW Government is investing $90 million in the Sydney Coordinated Adaptive Traffic System (SCATS) Congestion Improvement Program to make Sydney's traffic signals smarter to reduce unnecessary stopping. Several intersections around Parramatta CBD have been included for investigation.
Pinch Point Program	Road	The NSW Government has committed over $825 million to fixing pinch points across Sydney's road network, aiming to reduce traffic delays, manage congestion and improve travel times on major roads, particularly during weekday peak periods. For example, proposed intersection improvements at the Great Western Highway, Church Street and Parkes Street have been through community and stakeholder consultation and work on site is expected to commence early to mid-2019.
Parramatta City River Strategy	Ferry	The Parramatta City River Strategy provides a framework for the City of Parramatta's program of public domain works along the river foreshore. Revitalisation of Parramatta Quay is being realised through several landmark projects, including the Parramatta Ferry Wharf Upgrade (completed), the Escarpment Boardwalk (construction 2020), and the Charles Street Square Upgrade (design 2020).

5.4 Travel Demand Management

Maintaining Parramatta CBD's liveability and accessibility needs whilst accommodating its growth aspirations requires private car mode use to decline as a percentage of overall trips so existing road space can be freed for commercial vehicles, public transport and active modes to take greater roles in meeting the travel needs of a future Parramatta CBD. Transportation demand management is a tool that includes a variety of strategies that either individually or in integrated programs act to encourage travellers to use the more sustainable travel option for each trip. When in place they can help to achieve:

- Reduction congestion and infrastructure savings
- Improved mobility options for non-drivers
- Increasing traffic safety and public health
- Conserve energy and reduce pollution
- Creating more compact communities to support local economic activity

Based on a review of potential TDM strategies, five TDM strategies are recommended for implementation for Parramatta CBD as outlined below:

- **Establish a Transport Management Delivery team**–A transportation management delivery team for Parramatta CBD would be able to provide institutional support for transportation and parking management measures such as commute trip reductions, efficient car park utilisation and parking sharing and TDM marketing for new developments.
- **Commute Trip Reduction Programs** – As Parramatta CBD's residents population increases programs can be developed to target giving residents and commuters resources and incentives to reduce their car trips. Commute trip reduction programs can include combination of commuter financial incentive to use, public transport, parking pricing management, rideshare matching, cycle facility storage and pathway improvements and information. They are effective at reducing traffic and parking congestion in employment centres.
- **Freight Transport Management** – includes various strategies for increasing the efficiency of freight transport. These include improvements to resource-efficient modes, such as rail and water transport, improved logistics so fewer vehicle-kilometres are needed to deliver goods, and various incentives to encourage efficiency. It also includes measures such as delivery hubs and out-of-hour delivery schemes to reduce the impact of loading and servicing parking on the city and transport network. Improved freight logistics has the potential to reduce freight travel by 10-30%, although impacts may vary widely depending on conditions.
- **Transit-Orientated Development** –Transit-orientated developments are a key element of creating vibrant, liveable and sustainable communities that align with direction of the Parramatta CBD Planning Proposal. A typical transit-orientated development has a rail or bus station at its centre, surrounded by relatively high-density development progressively spreading outwards to lower-density development commonly to within 800m or 10 minutes walking distance of a rail stop. Evidence shows that residents of high quality transit-orientated developments tend to own about half as many cars and generate about half as many trips as they would if they were located in a typical suburban neighbourhood.
- **Efficient Parking Management** – Parking Management includes various strategies that encourage more efficient use of parking facilities. As a travel demand management strategy, parking management need to emphasise strategies which reduce total vehicle travel. For commercial developments this may include shared use of common parking spaces that do not have their peak parking demands coinciding whilst for residential development it could involve unbundling of parking spaces from the units so that residents that do not require a car are not allocated a car space that they do not need nor should have to pay for.

In order to achieve Parramatta CBD's vision, Council should consider establishing TDM programs that provide an institutional framework for implementing specific TDM strategies. Existing TDM strategies such as Council's requirement for green travel plans for new developments would work with and support these recommendations. A successful outcome would require council, TfNSW and the community working together to determine how best to identify and implement strategies into Parramatta CBD successfully.

An indicative TDM program implementation staging timeline is shown in Table 21.

Table 21: Indicative TDM Program Implementation Staging

Staging	Strategies
Short Term	▪ Transport Management Delivery Agency ▪ Commute Trip Reduction Programs ▪ Freight Transport Management ▪ Efficient Parking Management
Medium Term	▪ Active Transport Improvements ▪ Taxi and Ridehailing ▪ Transit Service Improvements ▪ Ridesharing ▪ Car- and Bikesharing ▪ Mobility Marketing
Long Term	▪ Efficient Parking Pricing

Implementation of one or more of the above demand management strategies on a large scale that includes businesses, employees and residents will allow Parramatta to gradually shift from a car-orientated community to a more compact and multimodal community, where parking is efficiently priced, and businesses, commuters and residents find incentives to use the most resource-efficient mode for trips they make. The strategies will also contribute to moving towards a Mobility as a Service (MaaS) model that enables greater integration of services and fewer journeys for travellers making trips at every scale to and from Parramatta CBD, reducing the demand for private car usage and parking needs.

Travel demand actions should be cognisant of potential long term changes to future work patterns both for workers coming to Parramatta and residents of Parramatta CBD leaving to work elsewhere as a result of COVID-19 learnings. A return to business as usual may not therefore be a given or the right approach.

5.5 Walking and Cycling

Due to the mixed residential and commercial land use uplift identified in the Planning Proposal for the CBD and immediate surrounds, the number of short distance trips to and within the Parramatta CBD is expected to increase in both quantity and mode share. As a result, cycling and walking will become a more important part of the transport mix.

If the car mode share for work trip purpose to Parramatta CBD reduces from its current 56% to 40% as envisioned by 2036, the walking and cycling demands would need to increase to accommodate the shift from car. Under such scenario, walking and cycling demand could increase four-fold compared to base year. This will necessitate the development and implementation of a wide range of infrastructure to cater for pedestrians and cyclists.

5.5.1 Pedestrians

Parramatta CBD is currently experiencing a significant level of public and private investment that is transforming the buildings and streets of the city. The construction of new buildings, civic infrastructure, Parramatta light rail and planned Sydney Metro West would result in ongoing disruption to pedestrian movements in the CBD that needs to be managed continuously to maintain the safety and accessibility of the pedestrian network.

The *Parramatta CBD Pedestrian Strategy* undertaken in 2017 provides an indication of the volume of pedestrians during the busiest pedestrian activity time of lunchtime peak for 2056. It predicts a significant increase in foot traffic within the CBD. The vast majority of streets south of the river would be carrying over 1000 pedestrians per hour with greater concentrations around Parramatta station and future transport nodes that would be expected in the AM and PM peak periods placing significant strain on the current footpath network.

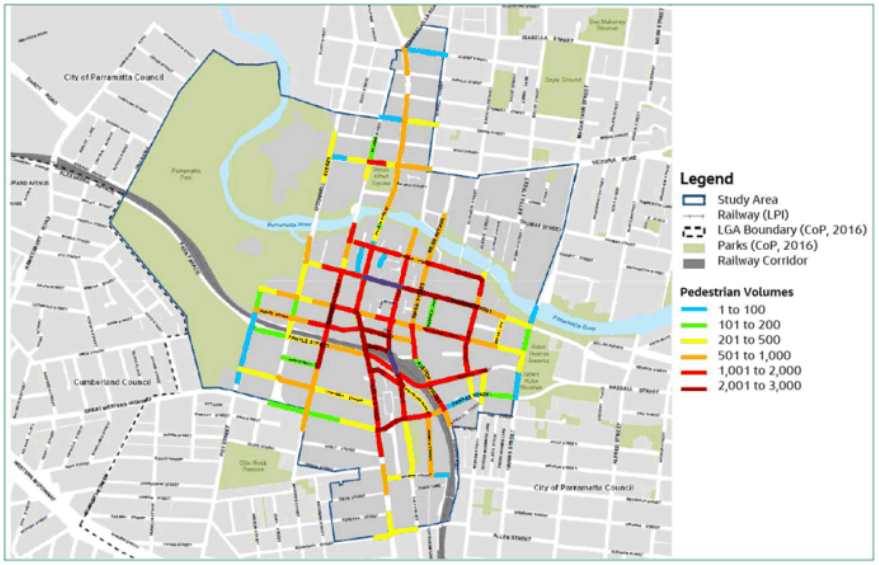


Figure 82: Future (2056) pedestrian peak hour volumes by street (Source: Cardno)

To address the pedestrian opportunities and issues and to meet the future pedestrian demand, a range of actions are identified as below:

- **Infrastructure and operation actions** – Traffic calming, pedestrian priority, improved perceptions of safety and direct paths of travel
- **Policy and development actions** – New development contribution toward pedestrian improvements
- **Behavioural change actions** – Providing residents, workers and general public with the right information, and knowledge to choose to walk on foot or use a mobility aid for short trips

Parramatta CBD Pedestrian Strategy identified five actions prioritised to provide greatest impact on pedestrian amenity, priority and safety in the CBD:

1	2	3	4	5
Implementation of a 40 km/hr speed zone throughout CBD.	Audit of all footpaths and upgrade or provide new infrastructure accessible by all users	Application of movement and place functions to the CBD with consideration of all transport modes	Amendment to DCP to provide permeable city blocks, active street frontages and provision for pedestrian infrastructure	Require developers to submit Green Travel Plans with their applications that demonstrates clear objectives and actions for pedestrian

In *Parramatta Ways – Implementing Sydney's Green Grid* (2017), the plan identifies opportunities to connect green spaces across Greater Parramatta with community facilities, transport nodes and neighbourhood destinations via safe and enjoyable walking routes as part of Sydney's Green Grid. The stated aim to reshape Parramatta as a liveable, walkable city is primarily focussed outside of the CBD boundary, but identifies the future high amenity pedestrian network to connect the dense growth precincts on the walkable fringe of the CBD.

Figure 83: Parramatta Ways map (Source: Parramatta Ways)

As part of the Parramatta Light Rail project, the following streets are identified to be pedestrianised:

- Macquarie Street between Horwood Place and Smith Street,
- Church Street between Market Street and Macquarie Street.

The introduction of the Civic Link, a planned pedestrian boulevard, will support liveability by connecting major Parramatta CBD destinations to each other, to the Transport Interchange and to the River though a pedestrian and cycle-friendly avenue, fit for the growing population of Parramatta. The link is approximately 490 metres long and 20 metres wide, extending from Parramatta Square to River Square and the broader foreshore precinct.

Current plans to transform Parramatta Quay into a public space and better access will support walking and cycling along the river foreshore. The Escarpment Boardwalk will be a river-level path that will allow cyclists and pedestrians to access the CBD foreshore on the northern bank. The boardwalk will complete the off-road walking and cycling path along the northern bank of the Parramatta River, connecting Parramatta Park to Melrose Park. The Charles Street Square upgrade, adjacent to the Ferry Wharf at Parramatta Quay, includes an improved riverfront walk, ramped walkways, providing a more accessible entry point to Parramatta from the River.

Through improving the pedestrian network within Parramatta, it would provide a more variety of local walking opportunities, as well as supporting the environment and community. High quality and safe walking facilities will also ensure that active transport trips are maximised, and car reliance is reduced for residents and visitors of Parramatta CBD.

5.5.2 Cyclists

The *Parramatta CBD Strategic Transport Plan* has identified a series of measures including cycling infrastructure to be provided within the CBD to ensure cycling will have a greater role as the city grows. Figure 84, shows *Future Transport's* vision for a connected 10km cycling network around Greater Parramatta by 2026. Delivering a completed cycling network is aimed at improving the safety and appeal of cycling as a transport option to a wider range of customers who currently may not be cyclists.

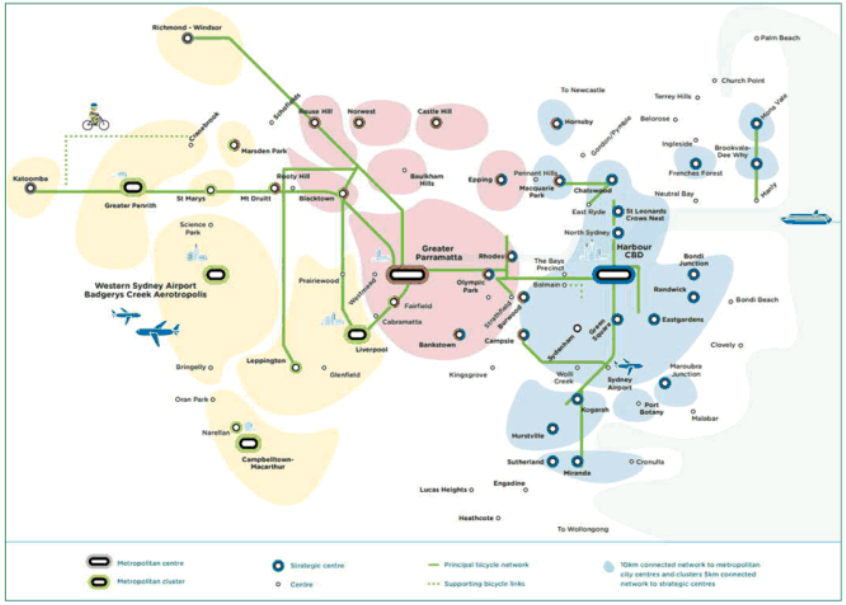


Figure 84: 2056 Greater Sydney Principal Bicycle Network vision (Source: Future Transport)

Parramatta Bike Plan (2017) sets out a 20-year plan that lays out a set of routes that will transform the safety and attractiveness of cycling in Greater Parramatta. The aspiration of the *Parramatta Bike Plan* is:

- To enhance the productivity and liveability of Parramatta through an increase in cycling, helping foster healthy and connected residents, workers and visitors
- For cycling to be safe, and perceived as a safe and attractive option for all members of the community, for those aged 8 through to 80
- To increase the proportion of people cycling in Parramatta to 5% of all trips to work, and 10% for those ending in the CBD

The Plan lays out a set of bike routes to transform the safety and attractiveness of cycling in Parramatta by connecting future dense precincts with the CBD, train stations and key destinations. Figure 85 shows the proposed Parramatta Cycling network.

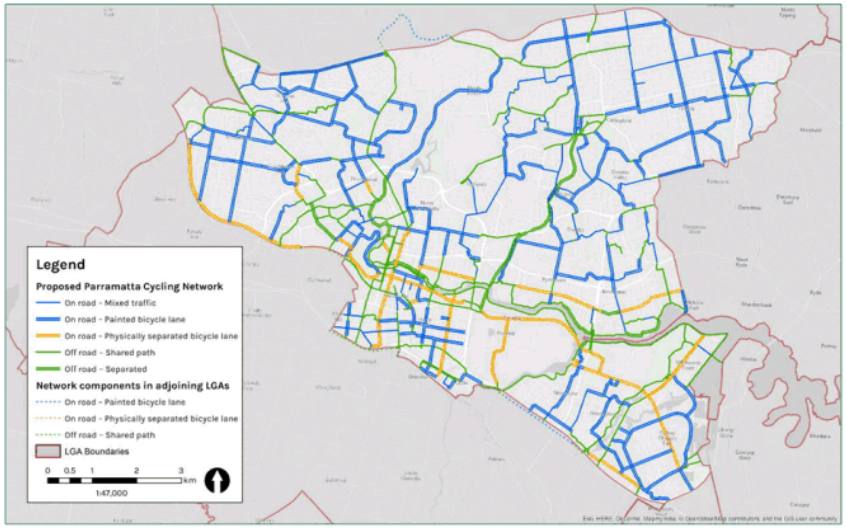


Figure 85: Proposed Parramatta Cycling network (Source: Parramatta Bike Plan 2017)

Through the implementation of these plans, cycling has the potential to relieve congestion or at the very least reduce the rate of growth of car demand as population and employment increases in the CBD.

Based on mode share analysis undertaken as part of this work, future travel demand could result in a three-fold increase in walking and cycling trips to/from the Planning Proposal area. Key routes to and within the CBD that would be utilised and will be needed to support the CBD Planning Proposal include:

- Completing the river foreshore paths on the northern and southern banks,
- A north-south physically separated bike path aligned with Marsden Street, Marist Place and Villiers Street,
- An east-west physically separated bike path along George Street.
- Civic Link: a shared pedestrian cyclist spine from the river to Parramatta interchange

In particular, the north-south cycling connections through Parramatta CBD seek to overcome key CBD access severance of the river, the M4 and the Great Western Highway. These connections will enable local and regional cycling trips to CBD destinations from north and south of the CBD via. contested city centre streets.

There is currently limited bicycle parking available within Parramatta CBD. The potential increase in cycling trips will need to be accommodated by appropriate bicycle parking provisions.

5.6 Public Transport

The objective of the Planning Proposal for the Parramatta CBD is to strengthen Parramatta's position as the Central CBD for Greater Sydney. This in turn will generate a large increase in trips that will require reliable access into and out of the CBD. As the city shifts away from car dependency, the implementation and upgrade of public transport is vital to the success of the vision. This section offers a range of public transport initiatives and how they will impact and shape the future network of Parramatta.

5.6.1 Trains

Without increased rail capacity and additional services to address long term increases in travel demand, rail customers will shift to other car-dependent modes of transport, which would increase congestion on the local and State road network. Reduced rail accessibility and increased car dependency and congestion would invariably lead to decreased urban amenity and land devaluation in the CBD.

The current train services stopping at Parramatta and Harris Park stations are forecast to experience increase in passenger demands with the introduction of the Planning Proposal. Modelling undertaken assuming the full implementation of Planning Proposal by 2056 indicates increase passenger demand along the northbound direction on the T5 line between Merrylands and Harris Park reaching 15,400 passengers during the two-hour AM peak. Assuming a train capacity of 1,200 for the existing 8-car trains, this would necessitate a train service every 10 minutes at a minimum to accommodate the demand.

Future Transport 2056 and the *Western Sydney Rail Needs Scoping Study both* outline development of a series of new rail projects to improve access and reach of mass public transport across the greater Sydney. Three of these elements of the preferred network pass through Parramatta, and are described below:

- **East-West Link Rail (potential future initiative)** – A visionary future line that extends the future Sydney Metro West at Westmead to connect to the Western Sydney Airport at Badgery's Creek. The East-West Link will establish a critical connection between the new airport and Aerotropolis to Parramatta and further east to City of Sydney.
- **Sydney Metro West from Greater Parramatta to Eastern Harbour City supporting growth** – Sydney Metro West provide a new, turn-up-and-go metro rail service to support Greater Parramatta, Sydney Olympic Park, the Bays and the Eastern Harbour City. Sydney Metro West would also relieve pressure on the busy T1 Western Link which is reaching its capacity by creating a new service separate from the network. This project is currently in the detailed planning stage and is described in more detail below.
- **Upgrades to the T1 North Shore, Northern and Western Line to increase capacity** - The upgrading of the lines with automated systems would increase the number of services possible on the line by approximately 20 percent creating capacity for an additional 4000-5000 passengers every hour per line.

The Sydney Metro West has progressed to the detailed planning stage. It is a metro rail service mostly underground running from Westmead/Parramatta to the City via Sydney Olympic Park, the Bays Precinct and Pyrmont. It intends to improve connections between Central River City and Eastern Harbour City, doubling rail capacity between these two areas. Based on the potential for metro services to run at 5-minute headways in each direction and assuming half a train capacity of 600 (1,200 full capacity) people either boarding or alighting each service at Parramatta, there could be in the order of 14,400 passenger movements to or from the metro station in the AM and PM peak periods.

In Parramatta, the new Sydney Metro West station will be strategically located to the north of the existing Parramatta train station and within the commercial core of Parramatta CBD, taking pressure off the existing station and giving customers a second rail option. It would also provide an easy, efficient and accessible interchange with buses and Parramatta Light Rail, aligning with Parramatta's multi-modal transport strategic direction. Detailed planning and environmental assessment documents for further public exhibition and community consultation are being developed. The metro station at Westmead and connection with the East-West Rail Link to the airport at Badgery's Creek will increase the reach of mass between Parramatta and the emerging land uses around the new airport.

Other *Future Transport 2056* initiatives identified for investigation for 10-20+ years include the following:

- **Parramatta to Epping high capacity train/mass transit links –** connecting Parramatta to knowledge jobs in the Global Economic Arc
- **Parramatta to Kogarah high capacity train/mass transit links** – connecting the Central River City to South Sydney, a corridor with high opportunity for urban renewal
- **Parramatta to Norwest mass transit/train link** – connecting two fast growing major centres with several innovation assets in between. The Parramatta-Norwest mass transit/train link will support longer-term population growth on this corridor, currently served by bus services. This will help to maintain 30-minute access to Parramatta from Norwest.

These new north-south mass transit/train links to Greater Parramatta will be able to increase the number of people that can access the Central River City within 30 minutes supporting jobs growth in Parramatta by improving rail accessibility from other parts of Sydney currently not within reasonable travel distance as well as help to manage pressure on existing transport links such as buses by shifting the demand to rail.

The impact of the three visionary metro lines on mode shares of private vehicle and public transport for people travelling to and from Parramatta CBD had been assessed using STM. The analysis revealed that the three metro lines increase the proportion of users taking public transport, by up to 5%. With the greatest difference observed for trips into Parramatta during the AM peak, and out from Parramatta in the PM peak supporting Parramatta CBD as a major employment and cultural hub.

The *Central City Rail: Economic Impact Study* proposes strategy for the implementation of the Central City Rail Network. The overarching principles for the strategy are:

- Establishing the Central River City as a second, connected transport hub for Sydney by providing comprehensive connections to the Eastern Harbour City via the Epping and Kogarah rail corridors as a priority
- Extending the rail to growth areas in the Western Parkland City and Norwest. Complete planning, and preserve corridors and provide intermediate mode connections to support initial growth
- Full integration and completion of all rail corridors and integrate networks extending Sydney Metro West to Western Sydney Airport.

These initiatives will significantly contribute to Parramatta CBD's future prosperity by being able to increase public transport capacity for people coming to Parramatta and provide vital connections to other parts of Sydney.

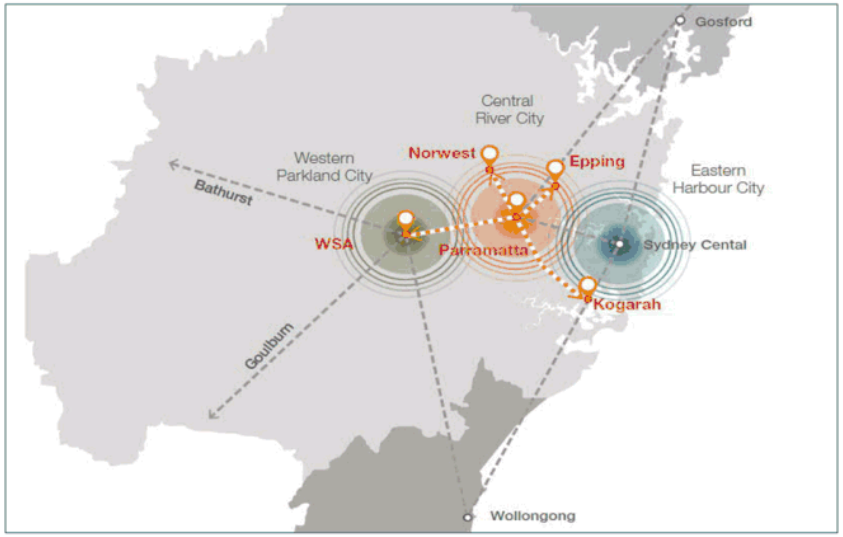


Figure 86: The potential future rail network connecting five cities (Source: Central City Rail Report)

5.6.2 Light Rail

Construction of a Parramatta Light Rail (PLR) has already commenced with services scheduled to start in 2023. Stage 1 of the light rail will connect Westmead to Carlingford via the Parramatta CBD and Camellia with a two-way track spanning 12 kilometres. It will link with existing public transport options, including train, bus and ferry, to form an integrated network capable to serve existing and future population. As well as providing additional capacity on the public transport network, PLR is aimed at driving economic growth by creating pedestrianised precincts that would encourage visitors and residents to visit local businesses.

The preferred route for stage 2 of PLR announced In October 2017, will link Sydney Olympic Park to the Parramatta CBD through Ermington, Melrose Park and Meadowbank, before crossing the Parramatta River south into Wentworth Point, passing through Silverwater and terminating at Sydney Olympic Park. Stage 2 is proposed to have 10-12 stops with travel times of around 25 minutes from Olympic Park to Camellia and a further eight minutes to the Parramatta CBD. It will connect with Sydney Metro West, Parramatta and Olympic Park heavy rail stations and Sydney Ferry services at Rydalmere and Sydney Olympic Park. Planning for Stage 2 is being developed in collaboration with the Sydney Metro West project with a Final Business Case currently being considered by the NSW Government following which an investment decision and the timing of construction to follow. The Greater Sydney Services and Infrastructure Plan suggests that in the medium to long term further Parramatta Light Rail extensions will be investigated.

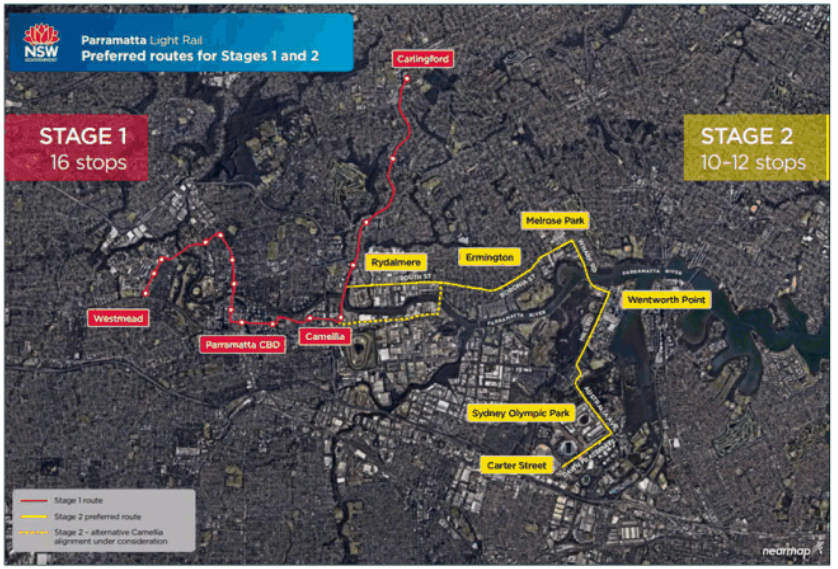


Figure 87: Parramatta Light Route preferred routes for Stages 1 and 2 (Source: NSW Government, 2017)

The Parramatta CBD Planning Proposal will increase the number of trips between the Parramatta CBD and the Olympic Park which currently would involve car trips but also within the Greater Parramatta area encouraging residents to make more shorter trips both within and to Parramatta CBD due to ease of use and improved public transport accessibility to areas that currently do not have direct or frequent public transport access.

5.6.3 Bus

The function of bus transit in accommodating Parramatta CBD's long-term transport task is subject to potentially significant evolution depending on the development of higher order modes - light rail, heavy rail, and metro - in line with growth of the CBD. The bus network would need to be restructured accordingly, identifying major corridors to maintain, reinforce or develop.

The *Parramatta CBD Strategic Transport Study* modelled bus passenger demands crossing ten cordons around the Parramatta CBD to understand the future demand for bus trips and its appropriateness as a mode along these corridors in the future. Key findings include total bus patronage crossing the Parramatta CBD cordon is expected to increase by approximately 10,000 and 20,000 inbound passengers in the 2036 and 2056 two-hour peak respectively. This includes demand for the equivalent of 45 and 90 additional services on each of the busiest T-way corridors.

Using Sydney Strategic Travel Model (STM), passenger numbers in all corridors are expected to increase, with largest increases along corridors in the southeast and southwest of Parramatta CBD. Figure 88 shows five bus corridors with greater than 5,000 passengers (total two-way) across the two-hour AM peak period in 2056: North-West Transitway, Parramatta Road, Bridge Street, Pitt Street and Centenary Road.

Figure 88: Forecasted 2056 Full Planning Proposal Bus Patronage – AM 2 hour peak (Source: STM)

Based on an analysis of the modelled bus patronage, the following three bus route services are forecast to have the highest increase in patronage due to the planning proposal:

- M91: Hurstville to Parramatta – travels to/from the Parramatta CBD via Church Street
- 907: Bankstown to Parramatta
- T80: Liverpool to Parramatta – travels to/from the Parramatta CBD via Argyle Street

Assuming a total capacity of 70 passengers per bus, the above results indicate that these three services would require an extra 20 services (M91), 6 services (907) and 4 services (T80) to cater for the additional bus patronage in 2056. Other services not mentioned above may also require some additional services to accommodate the additional forecast passenger demand.

Within and around Parramatta CBD, there are several pinch points and corridors where growth has been occurring or expected to occur, including:

- Windsor Rd, Church St and Smith St/Wilde Ave
- Pennant Hills Rd, Church St and Smith St/Wilde Ave
- Victoria Rd, Smith St/Wilde Ave
- North-West Transitway, Park Parade
- Hassall Street, Parkes Street
- Church Street South
- Liverpool-Parramatta Transitway, Great Western Hwy, Pitt St
- Pitt St

For the medium term, initiatives for consideration and further testing in Parramatta include:

- Some services to use the reopened Darcy Street to alleviate pressure on the existing interchange, although the design of the new street limits bus capacity
- Services accessing Parramatta CBD from Smith St – there is some potential to review the network, stopping patterns and termination points with the new Metro West station proposed between Macquarie Street and George Street.
- Changes to circulation of general traffic within the CBD to alleviate key congestion points around Parramatta Interchange such as the western approach along Pitt Street and the east on Station Street East / Smith Street.
- Improving the dual left turn from Great Western Hwy into Pitt St so buses no longer need to use the bus jump start and would receive more green time.

TfNSW recently published the 2036 Future Rapid Bus Network vision, shown in Figure 89, which will complement rail, metro and light rail services across Sydney Metropolitan Area. The rapid bus network will offer customers fast, frequent and reliable travel options with a legible train-like experience and turn-up-and-go services every 5-10 minutes across the day.

As illustrated below, the rapid bus network will support Parramatta CBD by offering customers a fast, frequent, and reliable travel options to the metropolitan centres of Liverpool, Hurstville,

Burwood, Ryde, Macquarie Park, Epping, Rouse Hill and Bankstown. The rapid bus lines will be supported by dedicated bus lanes, bus priority technology and high-quality bus stop infrastructure.

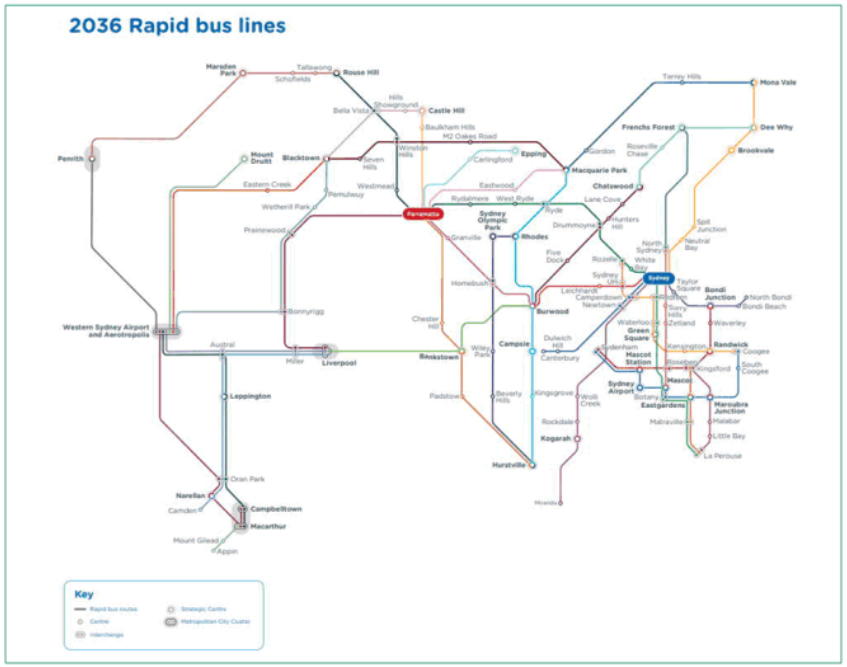


Figure 89: 2036 Future Rapid Bus Network vision (Source: Future Transport Strategy)

Some of the key actions for these proposed rapid bus routes as part of the plan are shown in Table 22. Many of these actions include addressing pinch points in the route, which are traffic congestion points, intersections or short lengths of road at which a traffic bottleneck exists, slowing down the network and causing travel delays.

Table 22: Key Actions for Rapid Bus Routes serving Parramatta CBD

Rapid Bus Route	Key Actions
Castle Hill – Liverpool via Parramatta and T-Way	Address bus pinch points with bus priority treatments on: ▪ Old Northern Road ▪ Windsor Road between Baulkham Hills and North Parramatta
Parramatta – CBD via Ryde	Address bus pinch points with bus priority treatments on: ▪ Victoria Road between Parramatta and Kissing Point Road ▪ Victoria Road between Top Ryde and Anzac Bridge In the longer term, complete investigation of Bus Rapid Transit on the Victoria Road corridor
Parramatta – Macquarie Park via Carlingford and Epping	Address bus pinch points with bus priority treatments on: ▪ Pennant Hills Road between North Parramatta and Carlingford ▪ Carlingford Road and Epping Road between Carlingford and Macquarie Park
Rouse Hill – Hurstville via T-way, Parramatta and Bankstown	Address bus pinch points with bus priority treatments on: ▪ Church Street, south of Parramatta ▪ Bus priority route between Granville and Chester Hill in conjunction with Parramatta and Bankstown councils ▪ Hume Highway between Bass Hill and Bankstown

From these actions, one priority is the delivery of route improvements on Old Northern Road and Windsor Road to speed up Rapid services between Castle Hill and Parramatta, saving customers journey time. South of Parramatta, these services will run directly to Wetherill Park, Prairiewood and Liverpool via the existing T-way.

The *Bus Priority Infrastructure Program* supports the 2036 Future Rapid Bus Network vision by delivering projects that make bus services faster and more reliable. Whilst currently identified projects are not of direct relevance to the Parramatta CBD, it is likely some of the shortlisted projects may result in additional changes to bus routes that also service Parramatta CBD. An example is the future light rail corridors shortlisted by Transport for NSW. In order to accommodate a transition between the two modes, changes to bus routes that service Parramatta CBD may be required. Intensified growth in travel demand resulting from development uplift in urban renewal areas / precincts (for example Greater Parramatta to Olympic Peninsula and Parramatta North Urban Transformation) will also require additional bus services.

Other key corridors in consideration for the medium to long term include:

- **Norwest/Showground to Parramatta future rail route** – this route was identified as a future rail route in *Future Transport*. In the interim, investigating the potential an for upgraded bus product along this route through Windsor Road or the North West Transitway is recommended.

- **Parramatta Road bus corridor** – this corridor has the potential for new frequent bus services along Parramatta Road connecting to Parramatta CBD. The recommended approach to Parramatta CBD could be via. Church St or James Ruse Drive and Hassall Street.

Any major increase in bus patronage will require additional bus services, which will add to operational issues at bus stops, on the road network and critically at Parramatta Interchange. For Parramatta Interchange, this will include layover, an essential function to ensure efficient and reliable bus operations which can be space consuming. In order to optimise the use of high value land, exploring new options to integrate bus layovers within the new CBD development would be desired. These could include arrangements such as basement or hidden designs that reduce visual and noise amenity impacts of bus operations and/or enable alternate use of road space.

5.6.4 Ferry

Whilst ferry services do not represent a large proportion of trips in and out of Parramatta, there are aspirations to continue improving its accessibility and efficiency to attract future customers.

The Parramatta City River Strategy is a comprehensive plan to transform the City River Foreshore into a vibrant public space that connects the city, enhances the history of the Parramatta River and its resilient to flooding. Following the upgrade of Parramatta Wharf in 2019, the transformation of Parramatta Quay is underway, with the start of construction on the Escarpment Boardwalk and new plans to redevelop Charles Street Square. These projects will improve equitable access to the ferry terminal.

Transport for NSW plans to modernise the ferry fleet and develop a new style ferry for the Parramatta River. These proposals will make ferry services more accessible, efficient and attractive and may result in some increased patronage at Parramatta. However, it is not anticipated these works will result in significant change in the currently minor role ferries have in accommodating trips accessing the Parramatta CBD, unless the timing and frequency of ferry trips change to service peak hour needs.

Improvements for ferry services including later and express services, as well as faster, lighter vessels offering more frequent service could attract future customers. Additional ferry wharves, services by smaller, more frequent vessels would also be beneficial in increasing transport options for residents of new developments in the Parramatta LGA.

5.7 Roads

While the road network has catered for the needs of Parramatta over the past decades, there will be increasing challenges as more residents and workers travel on the network. To support the integrated and efficient movement of people and goods, continued investment in better roads and addressing pinch points is important to improve traffic flows and reduce congestion. Roads and streets beyond their movement function can contribute to the network of public space and better deliver social, environmental and economic improvements for the wider community. Understanding desired movement patterns can allow roads and streets to be enhanced by transport and have the appropriate space allocation to move people and goods safely and efficiently and connect places together.

A Road User Space Allocation Policy has been developed by TfNSW, to ensure that the allocation of road user space is a deliberate exercise that considers the place, function and movement requirements of roads. A key principle is to realise a balance between place and the movement of people and goods by first establishing a network vision and primary road functions based on strategies and plans. When allocating road user space based on the network vision and road functions, all road users in the order of walking, cycling, public transport, freight and deliveries, and point to point transport ahead of general traffic and on-street parking for private motorised vehicles should be considered.

There will continue to be investment in roads with a shift in focus on major roads to provide movement corridors between strategic centres to support key centre to centre journeys. Local roads will move towards providing opportunities for access and connections with the local community and businesses. Utilising movement and place analysis to understand the needs of road links that comprise Parramatta CBD could be key to supporting this shift.

Some future road projects that are considered include:

- Upgrading key intersections to improve access to Parramatta CBD, including Pitt Street/Marsden Street intersection along Great Western Highway, and the Woodville Road, Parramatta Road and Church Street intersection at Granville
- Increase capacity on mass movement corridors such as James Ruse Drive, Victoria Road, Great Western Highway

Many road infrastructures projects have been planned around Parramatta and are completed or currently in progress. From the completed projects, Parramatta has already seen a shift in travel behaviours, with the WestConnex M4 Widening significantly improving the reliability of the M4 near Greater Parramatta and access across Sydney from commercial traffic. With the introduction of WestConnex, travel patterns have changed with reductions along parts of Parramatta Road and increases on other key links such as the Great Western Highway due to toll avoidance.

Within Parramatta CBD, many changes are also expected to occur regarding how roads are used and prioritised for each mode. While the introduction of Parramatta Light Rail and other initiatives outlined in this Plan will offer greater choice to travellers, the road network will require adaptation to accommodate this. The introduction of light rail has required changes to some local streets in response. They include:

- Macquarie Street's traffic direction will be reversed to run west-to-east with a pedestrianised zone between Horwood Place and Smith Street.
- George Street to become two-way between Macarthur Street and O'Connell Street. This will reduce the eastbound traffic capacity from two lanes down to one, however increase accessibility to the CBD from the east.
- Church Street to be pedestrianised between Market Street and Macquarie Street to accommodate the light rail and to support pedestrian activities within the CBD. Traffic will be diverted away from Church Street to surrounding inner ring roads of Marsden Street, O'Connell Street and Wilde and Macarthur Streets.
- O'Connell Street will be upgraded to accommodate more traffic due to diversion of general traffic away from Church Street due to Parramatta Light Rail.
- Targeted intersection upgrades to support re-routed traffic.

These changes on local streets in Parramatta are likely to change the travel behaviours observed within and around the CBD. As the shift towards sustainable and active modes progresses, the remaining roads catering for motor vehicles will experience less capacity, that would lead to more congestion unless the growth in car usage is managed.

5.8 Freight and Servicing

Dedicated and shared freight corridors and connections that will enable the efficient and reliable movement of goods is critical to enhancing Greater Sydney's overall transport system. As shown in Figure 90, the Greater Sydney strategic freight vision outlines a number of strategic roads for investigation that can improve freight access to connect Greater Parramatta to the freight network. The M4 motorway, located to the south of Parramatta CBD serves as a key freight route for Parramatta, connecting directly to Sydney CBD. The motorway network has a particularly important function in supporting road freight travelling in and around Sydney and also minimises amenity and safety impacts on places on local roads.

The Parramatta CBD Planning Proposal includes a directive on integrating land use and transport to ensure that urban structures, building forms, land use locations and development designs provide for the efficient movement of freight. Freight must not negatively impact the core development goals of increasing the amenity of the CBD. Last kilometre freight refers to the last leg of the journey of goods into shops, cafes, restaurants, offices and homes. As Parramatta grows, changes to the way everyone moves into the CBD will occur, including how freight is delivered. Potential directions include:

- Exploring methods to quiet out of hours deliveries in the CBD
- Investigating opportunities for gathering and using freight data to improve freight efficiency, and ensuring new buildings are equipped to meet the freight requirements for receiving and dispensing goods and services.
- Investigate the provision of minimum loading space requirements for new developments
- Investigate opportunities for the implementation of Courier Hubs. By establishing a hub, deliveries can be completed on foot, by bicycle or carted.

A joint effort from Council, NSW government, industry and the community is required to overcome barriers that the freight task may entail.

Customer Outcome 8 of the *Services and Infrastructure Plan 2056* states 'Efficient and reliable freight journeys supported by 24/7 rail access between key freight precincts with convenient access to centres. Initiatives for investigation (subject to business case development) are scheduled for either the next 10 or 20 years.

Initiatives for investigation in the next 10 years include the development and implementation of the Last Mile Freight Policy in collaboration with industry to encourage more freight movements in centres to take place outside of normal business hours. Transport corridors will be protected to reduce the cost of future delivery such as the following selected initiatives:

- Train improvements on T1, T2 and T5 train lines, including implementation of Advanced Train Control System (planning in-progress).
- Western Sydney Airport - Parramatta train link (for priority planning in collaboration with the Commonwealth).

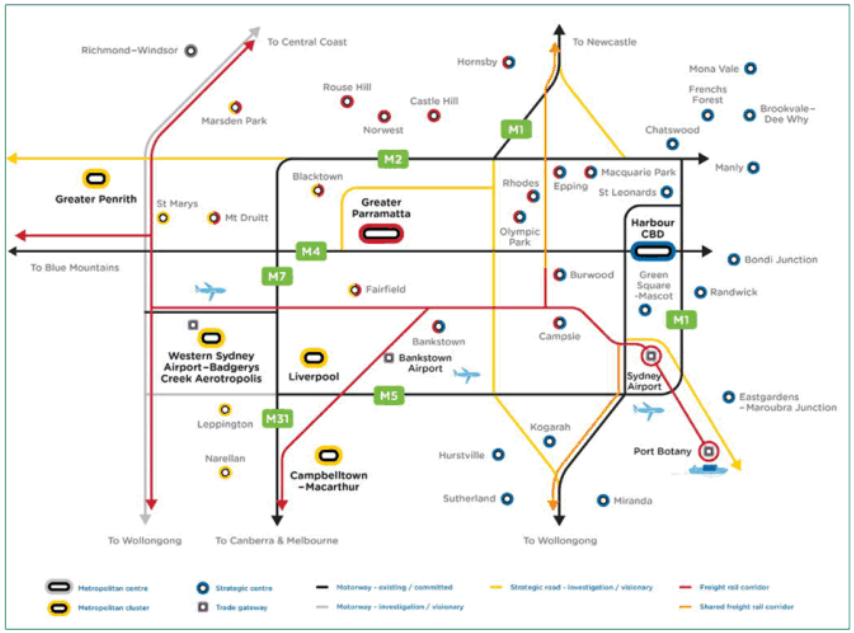


Figure 90: Greater Sydney Future Freight Vision (Source: Future Transport)

5.9 Private Vehicles and Parking

The Parramatta CBD Planning Proposal will increase the commercial floor space within the CBD and result in an increase in the number of work related trips into the CBD. Under a business as usual approach where car is the dominant mode of travel to Parramatta, the additional trips would lead to significantly higher volumes of private vehicle traffic on the surrounding road network if effective parking measures, greater public transport infrastructure and active transport connectivity aren't made available.

An increase in private vehicle volumes would lead to increased congestion which in turn will:

- Impact on all road-based travel modes including commercial vehicles and bus
- Decrease urban amenity and 'place' function of Parramatta CBD, regardless of proportional investment in road infrastructure
- Decrease economic productivity
- Impact on community health
- Devalue the land that comprises Parramatta CBD

Modelling conducted for the Parramatta CBD predicted that many travellers would continue to use private cars over the period to 2056. This indicates that without intervention that provides alternatives, the road network will be severely congested. It would also be difficult to achieve the aspirational mode share target of 40% for work trips by 2036. Car users value the comfort, flexibility and convenience of using their own vehicle, however if parking is made scarce and/or expensive, car users will switch to public transport if it is readily made available.

5.9.1 Interim Parking Rate

In response to these challenges, Council adopted an interim parking policy for Parramatta CBD to address the parking supply issue. The new parking policy shown in simplified form in Table 23 is based on the City of Sydney LEP parking rates applicable to Category A for Residential, and Category D for Commercial developments. The full parking rates are detailed in Appendix A. The implementation of the interim policy further reduces the maximum permissible number of parking spaces within the Parramatta CBD for new developments that are assessed using the new parking rates.

Table 23: Interim parking rate shown in simplified form (based on City of Sydney parking rates)

Land Use	Maximum Parking Rate
Residential	0.1 space per studio dwelling 0.3 space per 1-bedroom dwelling 0.7 space per 2-bedroom dwelling 1 space per 3-bedroom dwelling
Commercial	If the Floor Space Ratio (FSR) > 3.5:1 M = (G * A) / (50 * T) *where:* M = maximum number of parking spaces; G = GFA of all office/business premises in the building (m^2); A = Site Area (m^2); T = Total GFA of all buildings on the site (m^2) If the FSR <= 3.5:1 Office/Business: 1 space / 175 sqm GFA Retail: 1 space / 90 sqm GFA

5.9.2 Parking Supply Comparison of Parking Rate Scenario

To gauge the impact of the new parking rates a comparison against the original parking rates has been made to better understand the scale of the change. As it is not possible to predict the mix and location of specific commercial use types that will be delivered within the CBD, therefore a generic commercial floorspace has been adopted across the CBD for the purposes of testing the increase in commercial land use. Similarly, the residential dwellings have adopted existing dwelling structure (no. of bedrooms) proportions within Parramatta for the purposes of testing the increase in residential land use. These are shown in Table 24 for 2026, 2036 and 2056.

Table 24: Future Commercial and Residential Forecast Increases from 2016

Land Use		2026	2036	2056
Residential (dwellings)	0-1 Bedroom	930	1,750	3,740
	2 Bedrooms	3,050	5,730	12,250
	3+ Bedrooms	450	850	1,830
Commercial (area)		703,000m^2	978,300m^2	1,767,600m^2

Notes: Residential dwellings rounded to the nearest 10 and calculated based on existing dwelling structure proportions in Parramatta, information supplied by City of Parramatta (March 2020). Increase calculated based on GIS files supplied by City of Parramatta (March 2018).
Commercial area rounded to the nearest 100m^2 and increase calculated based on GIS files supplied by City of Parramatta (March 2018)

Using the forecast growth in commercial and residential dwellings, the parking rate scenarios have been used to identify the scale of additional parking supply forecasts. These are illustrated in Figure 91.

Figure 91: Additional Parking Supply Comparison

Considering population and employment growth, the scenario with the new parking rates for future residential and commercial developments has the potential to a total of 15,460 additional parking spaces comprising 11,150 residential and 4,310 new commercial parking spaces by 2056 i.e. full implementation of Planning Proposal. Using the previous City of Parramatta parking rates would add a further 10,230 residential spaces and 13,370 commercial spaces by 2056 within Parramatta CBD. That would result in a total of 39,060 parking spaces by 2056. This would be a significant increase in additional parking spaces compared to if the interim parking rate is adopted.

The implementation of the interim policy has the effect of restricting the maximum number of development-related parking spaces in Parramatta CBD. By 2056, the maximum number of additional commercial parking spaces could be four times lower than if the original Parramatta CBD policy rates were retained. The carpark allowance for residential dwellings would also drop significantly, reducing the total residential parking spaces allowed to half the original parking policy rate.

5.9.3 Parramatta CBD Forecasted Demand Comparison

The STM modelling undertaken to support the analysis of the Parramatta CBD Planning Proposal was employed to compare the impact of changes to the parking policies on the road network. The impact on forecast growth has been calculated based on the change in parking rates for office/commercial developments and the percentage contribution of office/commercial employment to total employment in the Planning Proposal area to the Strategic Transport Model totals. A comparison of the additional projected peak period demand for both 2026, 2036 and 2056 is illustrated in Figure 92. The volumes show the additional car trips when compared to the 2026 LEP (Base) Scenario, which forecasts 59,400 trips in the AM and 96,200 in the PM peak. These include all additional trips which travel in/out of the Parramatta CBD area.

Figure 92: Peak Period Demand Totals – Parking Rate Comparison

When comparing the 2026 Partial Planning Proposal Model to the 2026 Base Model, and taking into consideration the interim parking rate as well as population and employment growth, Parramatta CBD has the potential to add approximately 4,500 trips in the AM peak period, and 8,800 trips in the PM. This results in a total of approximately 63,900 trips during the AM peak and 105,000 trips in the PM peak. This increase does not account for the implementation of other travel demand measures to encourage mode shift. The implementation of the new parking rates has removed 2,200 trips in the AM peak, and 2,800 trips in the PM peak period. This represents approximately 3% of the overall demand forecasted.

As more commercial buildings and residential dwellings are developed, the difference in additional vehicles seen across the two parking rates would become more substantial going forward. When analysing the additional trips expected for 2056 (Full Planning Proposal) with the interim parking rate in place, it is expected there could be an additional 18,400 trips in the AM peak and 36,500 trips in the PM peak period. This results in a forecasted vehicle trip rate of approximately 77,700 trips in the AM peak and 132,700 trips in the PM peak. Reverting to the original parking rates would add a further 9,000 trips in the AM peak and 11,800 trips in the PM peak. This represents 8-10% of the overall demand forecasted, and significant additional trips, compared to if the interim parking rate is adopted.

5.9.4 Interim Parking Rate Considerations

Whilst the new policy is effective in reducing the supply of car spaces in new developments, a disadvantage to the policy is its lack of consideration for a residential building's location in relation to its walking distance to the train station, light rail and major bus stops. Even though the aspiration is to move the city toward a less-car dependent future, there will still be users who would be dependent on their cars to perform daily activities for tasks that public transport could not reasonably be considered as an alternative mode. As a result, residents may still want or need to own a car. A blanket parking policy that does not take into account location and distance of the development from transit stops would disproportionately impact such sites making them less attractive to develop at these rates with the likelihood of developers regularly challenging and seeking to provide additional spaces on these sites.

The City of Sydney's parking policy specifies different parking rates for different locations, separated into Categories A, B and C. These have been categorised based on accessibility and transit convenience and defined in their *Land Use and Transport Integration Map.* A similar approach would be considered sensible to fine tune the interim parking rate for the City of Parramatta so that developments on the fringes of the CBD would be allowed to provide more parking spaces compared with those that are located closer to public transport nodes.

5.9.5 Permanent Implication of Interim Parking Rate

The Interim Parking Rate with adjustments for residential and commercial developments and the other land uses detailed in Table A.1 in Appendix A in the City of Parramatta aims to limit the supply of parking spaces within Parramatta CBD, as commercial and high-density residential land use continues to increase. The interim parking policy adopts a similar approach to the City of Sydney parking applying different rates for different locations, separated into Category A and Category B. The allocation of categories is based on proximity to train stations within the vicinity of Parramatta CBD.

Category A includes locations which are:

- Within 800m or a 10-minute walk approximately from Parramatta train station
- Within 800m or a 10-minute walk approximately from the future Metro Station
- Within 400 m or a 5-minute walk approximately from Harris Park train station (no express services)

Other locations at the CBD fringes considered remote from public transport are allocated Category B. These category allocations are shown in Figure 93.

Figure 93: Parramatta Residential Parking Rate Categories

Category A areas adopts a more restrictive maximum parking rate applicable to residential dwellings that are close to train stations and within the proximity of Parramatta CBD. By reducing the maximum parking supply for dwellings within certain walking distance of the train station, residents who live within the walking catchment would be able to get to the station by walking or cycling instead. With the implementation of Sydney Metro West, the future metro station and Parramatta light rail stops, more of the CBD will become accessible by public transport lessening the need to provide parking spaces within residential dwellings that are close to these stations.

Outside of Category A i.e. Category B areas permit a higher rate of on-site parking for residential dwellings. This is due to their greater distances of these sites from the rail station and the commercial core necessitating need for residents to own a car for their daily needs.

The proposed permanent parking rates are shown in Table 25.

Table 25: Proposed Permanent Parramatta Parking Rate

Land Use	Category	Maximum Parking Rate
Residential	Category A	0.1 spaces per studio dwelling 0.3 spaces per 1-bedroom dwelling 0.7 spaces per 2-bedroom dwelling 1 spaces per 3 or more-bedroom dwelling
	Category B	0.2 spaces per studio dwelling 0.4 spaces per 1 bedroom dwelling 0.8 spaces per 2 bedroom dwelling 1.1 spaces per 3 or more bedroom dwelling For each dwelling up to 30 dwellings – 0.167 spaces For each dwelling more than 30 and up to 70 dwellings – 0.1 spaces For each dwelling more than 70 dwellings – 0.05 spaces
Commercial		If the Floor Space Ratio (FSR) > 3.5:1 M = (G * A) / (50 * T) *where:* M = maximum number of parking spaces; G = GFA of all office/business premises in the building (m^2); A = Site Area (m^2); T = Total GFA of all buildings on the site (m^2) If the FSR <= 3.5:1 Office/Business: 1 space / 175 sqm GFA Retail: 1 space / 90 sqm GFA

The permanent implementation of the adjusted interim parking rate policy has the effect of reducing the supply of parking spaces in new developments in the CBD. As population and employment increases over time, this will become increasingly critical to reduce utilisation of private vehicles to lessen the impact on the road network and the need for large scale investment in road infrastructure. The new parking rates would also serve as a driver to encourage greater shift towards sustainable and active transport modes and investment in infrastructure that would support and facilitate the use of these modes providing environmental and amenity benefits key to success of the city going forward.

5.9.6 Parking Price

Higher parking prices can naturally be expected as parking supply decreases in line with adoption of the adjusted interim parking rate. An increase in parking prices is one of the most effective demand management mechanisms to discourage users particularly commuters from driving into the CBD. Drivers are sensitive to pricing and parking fees are found to have a significant impact on vehicle trips. When parking fees increase, vehicle trips generally decrease by the same factor providing an efficient mechanism to reduce congestion and encourage mode shift.

Short stay parking with a high turnover is important to the existing and proposed business and retail developments within the inner core of Parramatta CBD. Parking pricing can prioritise users, encourage turnover of these spaces and encourage non-auto modes as alternative modes of travel the CBD.

The effect of parking pricing and demand response has been well researched. For example, where parking price increases by 20% (TRACE, 1999), there is expected to be a 1.6% reduction in commuting as drivers, and a 0.4% shift to other modes for same commuting trips.

STM modelling suggests an increase of approximately 77,900 daily trips by car by 2026, and 145,200 daily trips by 2036. An increase of 20% in parking fees would have the effect of reducing the growth by 7,200 in 2026 and 9,400 in 2036. By 2036, current projections expect car driver trips to make up 48% of all daily trips. A further 0.9% decrease can be expected if parking price is increased reducing car driver trips to 47.1% of daily trips to/from Parramatta CBD. Increases in car passenger, rail, bus and active transport trips will also be anticipated.

5.9.7 Other Parking and Transport Management Strategies

As parking becomes more stringent and costly, the transit network supporting Parramatta CBD needs to be prioritised in terms of serviceability and capacity. A list of additional strategies suitable for Parramatta CBD have been shown in Table 26.

A key benefit of implementing the new parking policy is that it would reduce the supply of parking within the CBD as residents and workers opt for other modes of transport. Increasing parking fees would also reduce daily vehicle trips and encourage increased mode share of public transport and active transport. Changes are more effective when done in conjunction with other parking and transport management strategies that collectively help to incentivise car users to switch to alternative modes.

Table 26: Parking Management Strategy Implementation

Strategy	Implementation
Parking Regulations	Review parking regulations to prioritize uses, encourage turnover, and encourage mode shifting, particularly for the most convenient spaces.
Improve Enforcement	Improve parking enforcement, so it is effective and customer-focussed in order to reduce parking management problems and build community support. Examples include in-ground parking sensors, using license plate recognition technology etc.
Carpark and Shared Parking	Encourage sharing by limiting on-site supply and relying on public parking facilities provided by the municipal government and commercial operators. Support sharing with a comprehensive parking supply inventory and development of parking brokerage services. Increase car share supply and options in Parramatta CBD. Examples include GoGet, Flexicar and Popcar.
Satellite Parking	Satellite parking refers to parking offers on the edge of the CBD and along public transport routes. Council's 2011 CBD parking strategy identified the need to develop satellite parking stations around the CBD. By encouraging this strategy, it aims to shift long-term parking away from the inner core of the CBD to the periphery.
Smart Parking Systems	Implement smart parking systems in the CBD to help users easily identify where available parking is located and how full the parking stations area. These systems can help mitigate impacts from any parking losses.
Ridesharing and ride-hailing	Continue to improve ridesharing and ride-hailing services into Parramatta CBD. Where demand for services increases, these can convert convenient parking to passenger pickup areas. Examples include general taxi, Uber, Lyft, Ola, Didi etc.
Repurposing Existing Carparks	Repurpose existing parking spaces within Parramatta CBD to reduce carparking supply in existing developments approved under the previous Parking rate.
Transport Demand Strategies	Implement transport demand strategies such as transportation management delivery agencies, commute trip reduction programs and transit-orientated development that encourage travellers to use the most efficient travel option for each trip, considering all impacts.
Active transport	Continue to improve active transport infrastructure, such as footpaths and cycling routes. Improved active transport solutions within the Parramatta CBD will aid in the reduction of congestion within and around Parramatta CBD, leading to enhancement in liveability.
Public Transport	Continue to improve public transit coverage and frequency, particularly serving areas with parking problems. Current projects such as the Sydney Metro West and Parramatta Light Rail will move toward creating a dense, frequent public transport network accessible to the entire CBD. This will allow a reduced time spent on travelling, and encourage users to change to trains, buses and light rail, bringing commuters to work and students to school.
Park and Ride Facilities	Park and ride facilities allow patrons to park their vehicle and ride public transport to complete their journey. Adding park and ride facilities closer to trip origins for Parramatta commuters is likely to encourage patrons to take public transport to reach the CBD, aiding to the reduction of congestion and car use within the CBD.

5.10 CAV Technology

The *Future Transport Technology Roadmap* and *Future Transport Strategy* identify a range of new forms of mobility that may emerge over the next 40 years including Connected and Automated Vehicles (CAVs) and alternatively fuelled vehicles. The roadmap and strategy ensuring that all forms of mobility work together as part of a single transport system by prioritising different forms of mobility based on the function they perform. For example, in busy centres, public transport and walking will be prioritised over CAVs to ensure that customers have efficient and reliable journeys

The emergence of CAV technology has the potential to produce both positive and negative consequences. CAV's are more likely to avoid crashes, significantly improving road safety. Autonomous vehicles could be for private use only or potentially as hire for ride services. This has the potential to increase the efficiency of the road network, with vehicle trips optimised to reduce road network demands. A risk of private ownership is that, to avoid parking fees, vehicles will be sent to other locations or back to the home point to park for free. This could potentially double demands on the road network, reducing pedestrian amenity. Road user pricing reforms are anticipated to mitigate some of this impact. In the context of Parramatta, there is potential that congestion charging could be required in the long term to regulate vehicle demands in the CBD and maintain an amenable environment for pedestrian.

6.0 Applying the Vision – How Do We Get There?

The Parramatta CBD Planning Proposal should be supported by transport measures that aim to ensure as population and employment increases, the transport system will keep up and continue to support and service the community efficiently. As shown in the modelling analysis, the growth in trips to/from Parramatta from the LEP cannot be accommodated in private vehicle trips. As users are encouraged to shift away from car mode share to walking/cycling and public transport, demand for these modes increases and will require additional infrastructure and improvements to cater for this demand.

It is important to integrate Parramatta's transport network and provide the appropriate level of transport service for all who want to travel to, from or within Parramatta. This will ensure its growth from the planning proposal is enabled and activated by transport options, rather than constrained by it.

This section will explore the transport planning thinking and alignment of the NSW Government's and Council's vision to be Sydney's Central City, sustainable, liveable, and productive. For each mode of transport, the overall objectives are outlined and the short, medium and long-term projects that are essential to shape the desired Parramatta of the future.

The key transport goals and associated benefits from addressing the transport issues that will face Future Parramatta are listed below:

Productive Economy

An improved transport network enables economic activity, trains and buses bring commuters to work and students to school, and trade vehicles deliver services to households and businesses.

Liveable Community

Transport is a 'placemaker'. It can transform the public domain, activate centres and unlock new activity.

Transport can also generate new commercial and housing developments and renew existing neighbourhoods and spaces.

Sustainable Society

Long term planning will ensure we deliver more with less, maximise the benefits of planned investment, and improve the emissions intensity and environmental costs imposed by the transport system.

6.1 General Solutions

This ITP is a strategic document, developed to support consideration of the CBD Planning Proposal. While the ITP shows how active, public and road transport can support planned development in the CBD, as a strategic document, it does not go into the detail of how and when transport improvements will be developed. Council and the State have joint responsibilities for transport in the CBD. Council and Transport for NSW should work together to refine the improvements identified in the ITP and identify the future transport provision for the CBD. An early output of this collaboration should be a Parramatta CBD Access Strategy which guides the planning, design, and implementation of transport infrastructure and services in Parramatta CBD.

Table 27: Recommended general actions

Timeframe	Recommended Action		Responsibility
Short	G1	Council and State Government will coordinate and collaborate on implementation of the ITP and other plans for transport improvements serving Parramatta CBD.	City of Parramatta, TfNSW
Short	G2	Council and the State Government will collaborate to prepare an Access Strategy for the Parramatta CBD.	City of Parramatta, TfNSW

6.2 Travel Demand Management Solutions

Travel demand management solutions can better utilise existing infrastructure, either using advanced technology, or by modifying travel decisions and driver behaviour. The range of applications for technology-enabled solutions is broad, spanning from optimising available capacity and making more efficient use to better network flows. The implementation of localised travel demand management strategies is vital to successfully ensure that Parramatta can accommodate the growing demand.

The recommended travel demand management actions for Parramatta CBD are provided in Table 28. Mode-specific travel demand management actions are discussed in their associated mode section.

Table 28: Recommended actions to improve travel demand management

Timeframe	Recommended Action		Responsibility
Short	TD1	Establish Travel Choices for Parramatta CBD to manage transport and parking and encourage reduction in car trips contingent upon identification of funding, resourcing, governance and delivery arrangements	TfNSW

6.3 Walking and Cycling Solutions

Improved walking and cycling within the Parramatta CBD will lead to a more sustainable society through improved public health outcomes, prioritise emissions and reducing environmental costs. In addition, it will aid in the reduction of congestion within and around Parramatta CBD leading to enhancement in liveability. To achieve this, several strategies have been identified to improve active transport:

- Promote cycling as a means of accessing the CBD,
- Improve the walking experience to help achieve a mind shift towards walking in the city,
- Promote active transport trips within a 10km radius of the CBD.

To implement the active transport strategies, recommended actions have been outlined in Table 29.

Table 29: Recommended actions to improve active transport

Timeframe	Recommended Action		Responsibility
Short	WC1	Update requirements in DCP for end of trip facilities and bike parking in all new buildings	City of Parramatta
	WC2	Encourage bike share and micro mobility schemes for residents, employees and visitors for short trips	City of Parramatta
	WC3	Deliver pedestrian prioritisation, safety and amenity measures such as street trees, lighting, additional crossing locations, shared zones and signal priority	City of Parramatta, TfNSW
	WC4	Deliver dedicated cycling infrastructure within the Parramatta CBD that connects to the Principal Bicycle Network	City of Parramatta, TfNSW
	WC5	Prioritise high quality pedestrian infrastructure that aligns with Parramatta Ways and other key walking routes within 2km of CBD	City of Parramatta, TfNSW
	WC6	Pedestrian modelling of demand in the CBD needs to consider Civic Link, Light Rail and Metro West	TfNSW
Medium	WC7	Develop the Principal Bicycle Network to fill existing gaps, focusing on dedicated infrastructure to and within the CBD	City of Parramatta, TfNSW
	WC8	Provide sufficient footpaths to accommodate forecast increased pedestrian movements as density increases	City of Parramatta
	WC9	Implement infrastructure that supports, and investigate means to further improve and widen coverage of 40km/h zones within and surrounding the CBD.	City of Parramatta

6.4 Public Transport Solutions

Public transport improvements will form the foundation of a successful transport outcome for Parramatta CBD. An efficient public transport network enables economic growth, with trains and buses bringing commuters to work and students to school. Reduced time spent on travelling, particularly for their commute to work, will increase people's access to jobs and business' access to workers. Options for 24-hour transport, on-demand technology and fleet roll out can contribute to an improved public transport network.

To achieve this, strategies identified to improve public transport:

- Work with NSW and Federal Government to plan a rail network for the future of Western Sydney, including the 'Central City', to support a growing distribution of jobs and services and move from a radial system to a connected system.
- Create a dense, frequent public transport network accessible to the entire CBD.

To implement the strategies, a list of recommended public transport solutions is described in Table 30.

Table 30: Recommended actions to improve public transport

Timeframe	Recommended Action		Responsibility
Short	PT1	Address existing and forecast capacity issues along the T1 Western Line and improve service along the T5 Cumberland Line	TfNSW
	PT2	Consider the need for, and plan for additional railway stations in the CBD to offer additional travel options from broader areas to the CBD and address future level of demand	TfNSW
	PT3	Investigate feasibility of prioritizing the potential for travel by rail to the CBD from other existing or new demand market include: ▪ Planned growth areas to the east such as the Greater Parramatta to Olympic Peninsula and the Bays Precincts, including via the Sydney Metro West ▪ Western Sydney Airport ▪ North West and South West Growth Centres ▪ Parramatta to Epping mass transit ▪ Parramatta to Kogarah mass transit ▪ Parramatta to Norwest	TfNSW
	PT4	Work with NSW government to investigate the prioritization of on-street public transport services and to investigate new bus layover areas	TfNSW
	PT5	Secure surface and underground corridor protection for future public transport services	TfNSW
Medium	PT6	Improve the coverage, frequency and accessibility of the public transport network	TfNSW
	PT7	Upgrade Parramatta Interchange to ensure a streamlined multi-modal network	TfNSW
	PT8	Improve intermodal transfers by linking up bus, train and light rail services with pedestrian and cycling infrastructure at key points.	TfNSW
	PT9	Include more buses along road corridors that have roads with VC > 1	TfNSW

Timeframe	Recommended Action		Responsibility
Long	PT10	Implement initiatives as indicated in the Western Sydney Rail Needs Scoping Study and Future Transport 2056, as well as future stages of the Parramatta Light Rail.	TfNSW

6.5 Road Solutions

Road infrastructure solutions involve adding, improving or changing current road infrastructure. The road network within Parramatta CBD needs to support the use of alternative transport modes, prioritise the safety of users, allow for future growth and use existing infrastructure efficiently to reduce peak congestion. Peak congestion periods on the road network should be addressed through a demand management approach, to better utilise the existing network. Implementation of the movement and place typology as discussed in *Future Transport Strategy* for Parramatta CBD will also aid in the CBD becoming a space for people. The setting of speed limits should consider safety of the most vulnerable road users in the first instance, then the road hierarchy and its purpose.

Recommended actions to improve the road network are outlined in Table 31.

Table 31: Recommended actions to improve road network

Timeframe	Recommended Action		Responsibility
Short	RN1	Utilise movement and place analysis to understand the needs of road links that comprise Parramatta CBD	City of Parramatta, TfNSW
	RN2	Maintain working mesoscopic and/or microsimulation models of the CBD network for ongoing evaluation and testing of the road network as it evolves	City of Parramatta, TfNSW
Medium	RN3	Upgrade key intersections to improve access to Parramatta CBD, including key intersections along Great Western Highway, and Woodville Road/Parramatta Road/Church Street	TfNSW
	RN4	Investigate increasing capacity and targeted improvements on key corridors such as James Ruse Drive, Victoria Road and Great Western Highway	TfNSW
	RN5	Undertake periodic optimisation of traffic signals, providing modal priority in line with the M&P aspiration	TfNSW
	RN6	Inform motorist of real time travel information including traffic conditions and travel time to a range of destinations through dynamic signage	TfNSW
	RN7	Implement Local Area Traffic Management measures in the local road networks within and around Parramatta CBD	TfNSW

6.6 Freight and Servicing Solutions

Freight and servicing solutions that allow trade vehicles to deliver services to households and businesses in shorter, more direct lines allow for a productive economy and liveable community. As Parramatta CBD grows, there will be increasing daily challenges and inefficiencies for freight delivery. Therefore, implementation of a last kilometre freight plan, as well as upgrades for freight access to the CBD are crucial for the success of Parramatta.

Recommended actions to improve the freight and servicing are outlined in Table 32.

Table 32: Recommended actions to improve freight and servicing

Timeframe	Recommended Action		Responsibility
Short	FS1	Investigate freight transport management strategies to increase efficiency in and to Parramatta CBD, and the suitability of loading zones for 24-hour freight and logistics	City of Parramatta, TfNSW
	FS2	Develop a last kilometre freight plan to identify the actions to ensure last kilometre freight is considered as Parramatta CBD grows and changes	City of Parramatta, TfNSW
	FS3	Update controls in DCP to ensure new developments within the CBD consider loading/service facilities.	City of Parramatta

6.7 Private Vehicles and Parking Solutions

Combined with the promotion and support of walking, cycling and public transport, private vehicle use will need to be appropriately discouraged to ensure the CBD and surrounding road network can function as the city densifies. In this ITP, parking has been optimised as an area that requires management strategies that can aid in the reduction of private vehicle use. Such measures encourage a more attractive and vibrant public domain. Strategies identified to improve parking in Parramatta CBD include:

- Encourage behaviours that optimize the use of existing infrastructure, such as promoting car sharing initiatives,
- Promote modal shift towards public transport,
- Implement measures to reduce the number of cars travelling through Parramatta and the surrounding districts,
- Manage parking to meet community goals without increasing traffic

The City of Parramatta has reduced its parking rate requirements as an effective instrument to reduce the traffic impact on the network. Additional parking provisions and management strategies should be implemented to continue the development and support of sustainable transport.

Recommended actions to reduce private vehicle use are outlined in Table 33.

Table 33: Parking Vehicle and Parking Actions

Timeframe	Recommended Action		Responsibility
Short	PV1	Promote car sharing initiatives	City of Parramatta

Timeframe	Recommended Action		Responsibility
	PV2	Implement efficient parking management strategies that encourage more efficient use of parking facilities	City of Parramatta
	PV3	Investigate feasibility of additional park and ride facilities at appropriate existing and future public transport stops and stations outside of CBD with an attractive fare policy	City of Parramatta, TfNSW
	PV4	Permanently adopt the parking rates proposed in the ITP, and review public car parking fees, including early bird rates and evening rates	City of Parramatta
Medium	PV5	Continue to increase parking space provisions dedicated to electric vehicles and car share schemes	City of Parramatta

6.7 Alignment with Objectives

Each action and strategy align with objectives set out for this ITP. They can be found in Table 35.

Table 34: ITP Objectives

Objectives	
1	Deliver Parramatta Light Rail and Sydney Metro West, and planning for the future transport network
2	Improve existing train and bus links to extend the 30-minute catchment for transport access to Parramatta CBD
3	Adopt forward-looking policies, demand responsive services and innovative technologies that deliver transport solutions faster, and/or lower cost
4	Prioritise delivering walking and cycling improvements and supporting access within a 30-minute walk and ride of the CBD.
5	Align transport improvements with land use change to maximise the use of new services and sustainable transport mode share among new workers and residents
6	Identify and deliver targeted improvements to the road network to improve network capacity, and where necessary manage private vehicle trips to maximise the efficiency of the surface road
7	Leverage transport demand management techniques proven in the Sydney context, to maximise the efficiency of all transport modes in the network.

Table 35: Actions and objectives matching matrix – greater Parramatta level

	Alignment with Objectives						
	1	2	3	4	5	6	7
G1			■				
G2			■				
TD1							■
WC1				■			
WC2				■			
WC3				■			
WC4				■			
WC5				■			
WC6				■			
WC7				■			
WC8				■			
WC9				■			
PT1		■					
PT2		■			■		
PT3		■					
PT4		■				■	
PT5		■					
PT6		■					
PT7		■					
PT8		■					
PT9		■					
PT10	■	■					
RN1						■	■
RN2						■	
RN3						■	
RN4						■	
RN5			■			■	
RN6			■			■	
RN7						■	
FS1			■				■
FS2							■
FS3					■		■
PV1			■				■
PV2							■
PV3					■		■
PV4							■
PV5							■

6.8 Summary of Actions

Table 36 brings together the recommended projects and initiatives across modes.

Table 36: Summary of Actions across Modes

Recommended Action		Timeframe	Responsibility
G1	Council and State Government will coordinate and collaborate on implementation of the ITP and other plans for transport improvements serving Parramatta CBD.	Short	City of Parramatta, TfNSW
G2	Council and the State Government will collaborate to prepare an Access Strategy for the Parramatta CBD.		
TD1	Establish Travel Choices for Parramatta CBD to manage transport and parking and encourage reduction in car trips contingent upon identification of funding, resourcing, governance and delivery arrangements	Short	TfNSW
WC1	Update requirements in DCP for end of trip facilities and bike parking in all new buildings	Short	City of Parramatta
WC2	Encourage bike share and micro mobility schemes for residents, employees and visitors for short trips		
WC3	Deliver pedestrian prioritisation, safety and amenity measures such as street trees, lighting, additional crossing locations, shared zones and signal priority		City of Parramatta, TfNSW
WC4	Deliver dedicated cycling infrastructure within the Parramatta CBD that connects to the Principal Bicycle Network		
WC5	Prioritise high quality pedestrian infrastructure that aligns with Parramatta Ways and other key walking routes within 2km of CBD		
WC6	Pedestrian modelling of demand in the CBD needs to consider Civic Link, Light Rail and Metro West		TfNSW
WC7	Develop the Principal Bicycle Network to fill existing gaps, focusing on dedicated infrastructure to and within the CBD	Medium	City of Parramatta, TfNSW
WC8	Provide sufficient footpaths to accommodate forecast increased pedestrian movements as density increases		City of Parramatta
WC9	Implement infrastructure that supports and investigate means to further improve and widen coverage of 40km/h zones within and surrounding the CBD.		
PT1	Address existing and forecast capacity issues along the T1 Western Line and improve service along the T5 Cumberland Line	Short	TfNSW
PT2	Consider the need for, and plan for additional railway stations in the CBD to offer additional travel options from broader areas to the CBD and address future level of demand		
PT3	Investigate feasibility of prioritizing the potential for travel by rail to the CBD from other existing or new demand market include: ▪ Planned growth areas to the east such as the Greater Parramatta to Olympic Peninsula and the Bays Precincts, including via the Sydney Metro West ▪ Western Sydney Airport ▪ North West and South West Growth Centres ▪ Parramatta to Epping mass transit ▪ Parramatta to Kogarah mass transit ▪ Parramatta to Norwest		
PT4	Work with NSW government to investigate the prioritization of on-street public transport services and to investigate new bus layover areas		
PT5	Secure surface and underground corridor protection for future public transport services		
PT6	Improve the coverage, frequency and accessibility of the public transport network	Medium	TfNSW
PT7	Upgrade Parramatta Interchange to ensure a streamlined multi-modal network		
PT8	Improve intermodal transfers by linking up bus, train and light rail services with pedestrian and cycling infrastructure at key points.		
PT9	Include more buses along road corridors that have roads with VC > 1		
PT10	Implement initiatives as indicated in the *Western Sydney Rail Needs Scoping Study* and *Future Transport 2056*, as well as future stages of the Parramatta Light Rail.	Long	TfNSW
RN1	Utilise movement and place analysis to understand the needs of road links that comprise Parramatta CBD	Short	City of Parramatta, TfNSW

Recommended Action		Timeframe	Responsibility
RN2	Maintain working mesoscopic and/or microsimulation models of the CBD network for ongoing evaluation and testing of the road network as it evolves		
RN3	Upgrade key intersections to improve access to Parramatta CBD, including key intersections along Great Western Highway, and Woodville Road/Parramatta Road/Church Street	Medium	TfNSW
RN4	Investigate increasing capacity and targeted improvements on key corridors such as James Ruse Drive, Victoria Road and Great Western Highway		
RN5	Undertake periodic optimisation of traffic signals, providing modal priority in line with the M&P aspiration		
RN6	Inform motorist of real time travel information including traffic conditions and travel time to a range of destinations through dynamic signage		
RN7	Implement Local Area Traffic Management measures in the local road networks within and around Parramatta CBD		
FS1	Investigate freight transport management strategies to increase efficiency in and to Parramatta CBD, and the suitability of loading zones for 24-hour freight and logistics	Short	City of Parramatta, TfNSW
FS2	Develop a last kilometre freight plan to identify the actions to ensure last kilometre freight is considered as Parramatta CBD grows and changes		
FS3	Update controls in DCP to ensure new developments within the CBD consider loading/service facilities.		City of Parramatta
PV1	Promote car sharing initiatives	Short	City of Parramatta
PV2	Implement efficient parking management strategies that encourage more efficient use of parking facilities		
PV3	Investigate feasibility of additional park and ride facilities at appropriate existing and future public transport stops and stations outside of CBD with an attractive fare policy		City of Parramatta, TfNSW
PV4	Permanently adopt the parking rates proposed in the ITP, and review public car parking fees, including early bird rates and evening rates		City of Parramatta
PV5	Continue to increase parking space provisions dedicated to electric vehicles and car share schemes	Medium	City of Parramatta

6.9 Taking the Vision Forward

The development and actions outlined in this ITP responds to major transport and parking challenges, driven by substantial growth forecast in the residential population and jobs within the Parramatta CBD by 2056. When taking the vision forward, consideration for how the whole network functions needs to be accounted for. The transport network objectives are designed to protect and enhance the characteristics of Parramatta CBD and build on these as the city continues to grow and develop in the future. Strong transport capacity and connections will be crucial for the success of Parramatta CBD in its role as the Metropolitan Centre for the Central City.

The direction outlined in this ITP supports the Parramatta CBD Planning Proposal, by providing a strategic plan to manage the existing and future sustainable transportation needs of Parramatta CBD. The planned growth on the network can be accommodated by:

- Improvements to the public transport network on high trip corridors
- Delivery of walking and cycling infrastructure to cost-effectively shift trips within 30 minutes of the CBD
- Targeted upgrades of the road network to ensure maximized use of the existing road network
- Application of proven TDM to ensure the most efficient use of resources and road space allocation

Monitoring the success of the ITP is critical to supporting the development of Parramatta CBD. In this regard, the following measures are proposed to ensure that progress against the vision of the ITP is tracked:

- **ITP Review:** Ongoing review of the recommendations is important to ensure that they accurately reflect the latest population and development projections, and adjustments are made as necessary to ensure they remain relevant
- **Project delivery and coordination:** Ongoing monitoring of the delivering of ITP actions is required to measure progress against the vision and ensure consistency of purpose across the range of Council planning and policy documents and objectives
- **Monitoring impacts of projects:** Regular monitoring of mode share, travel behaviour and assessment of how the ITS strategies will be achieves is necessary to understand the impact and relevance of the ITP, and make changes or adjustments as necessary,

In addition to these measures, the following should be considered by the City of Parramatta:

- Continue to engage with TfNSW and other NSW Government partners to progress the actions
- Continue to monitor development approvals and activity in the Parramatta CBD study area, to capitalise on any opportunities that may arise through private sector development.

Appendix A. Parking Rates

Table A.1: Full parking rates (Source: Clause 7.3 (5) – Maximum parking rates, CoP Potential Draft LEP Provisions – Guide Only)

Proposed Use	Maximum number of parking spaces
Business premises and office premises	(a) A maximum of 1 car parking space to be provided for every 175 square metres of gross floor area where the building is on land which has a floor space ratio of no more than 3.5:1, or (b) For buildings on land where the floor space ratio is greater than 3.5:1, the following formula is to be used: M = (G x A) ÷ (50 x T) where: M is the maximum number of car parking spaces, and G is the gross floor area of all business premises and office premises in the building in square metres, and A is the site area in square metres, and T is the total gross floor area of all buildings on the site in square metres.
Centre-based childcare facilities	A maximum of 1 car parking space plus 1 space per 100 square metres of gross floor area.
Dwelling houses, attached dwellings and semi-detached dwellings	A maximum of 1 car parking space for each dwelling.
Health consulting rooms and medical centres	A maximum of 2 car parking spaces to be provided per consulting room.
Hotel or motel accommodation and serviced apartments	A maximum of: (a) 1 car parking space for every 4 bedrooms up to 100 bedrooms, and (b) 1 car parking space for every 5 bedrooms above 100 bedrooms.
Information and education facilities	A maximum of 1 car parking space for every 200 square metres of gross floor area
Light industries	A maximum of 1 parking space to be provided for every 150 square metres of gross floor area.
Places of public worship and entertainment facilities	A maximum of: (a) 1 space for every 10 seats, or (b) 1 space for every 30 square metres of the gross floor area, whichever is the greater
Residential flat buildings, dual occupancies and multi dwelling housing	A maximum of: (a) 0.1 car parking spaces for each studio dwelling, and (b) 0.3 car parking spaces for each 1 bedroom dwelling, and (c) 0.7 car parking spaces for each 2 bedroom dwelling, and (d) 1 car parking space for 3 or more bedroom dwelling.
Retail premises	In the case of a building that has less than 2000 square of retail premises: (a) A maximum of 1 car parking space to be provided for every 90 square metres of gross floor area where the building is on land which has a floor space ratio of no more than 3.5:1, or (b) For buildings on land where the floor space ratio is greater than 3.5:1, the following formula is to be used: M = (G x A) ÷ (50 x T) where: M is the maximum number of car parking spaces, and G is the gross floor area of all retail premises in the building in square metres, and A is the site area in square metres, and T is the total gross floor area of all buildings on the site in square metres.

Note. For any land uses that are not specified in the table above, a Parking and Access Report is to be supplied in accordance with the requirements in the Parramatta Development Control Plan.

Appendix B. Aimsun Modelling

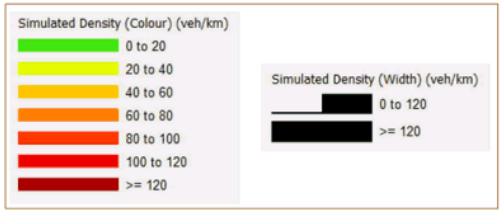


Figure B.1:Key for Density plots

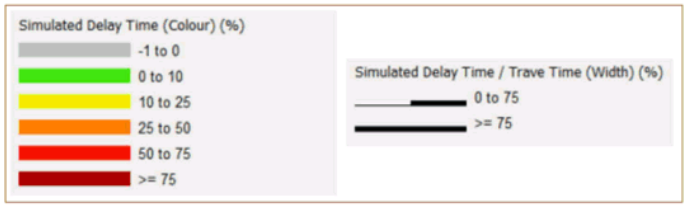


Figure B.2: Key for Simulated Delay Time plots

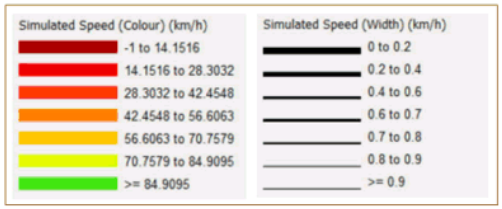


Figure B.3: Key for Simulated Speed plots

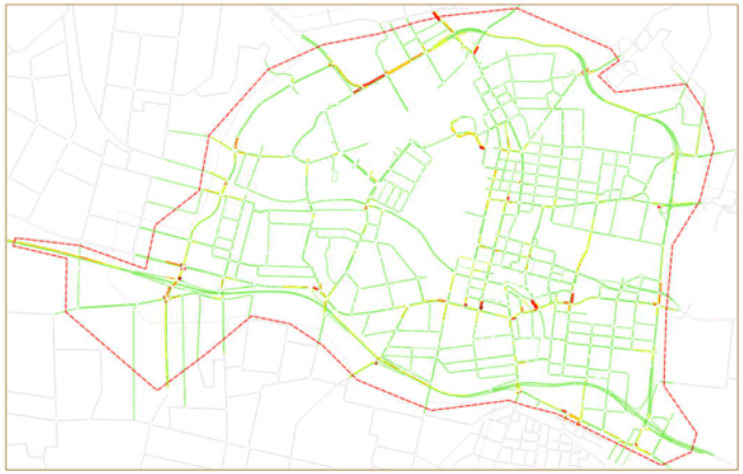


Figure B.4: 2026 Density plot, 7:45-8:00 AM

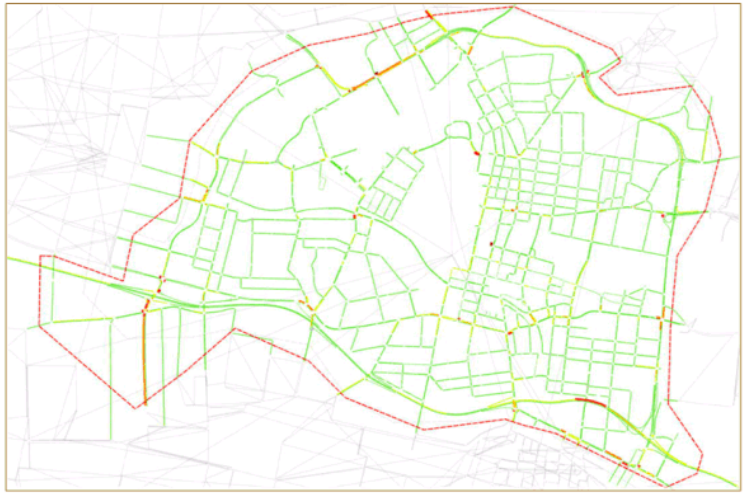


Figure B.5: 2016 Density plot, 7:45-8:00 AM

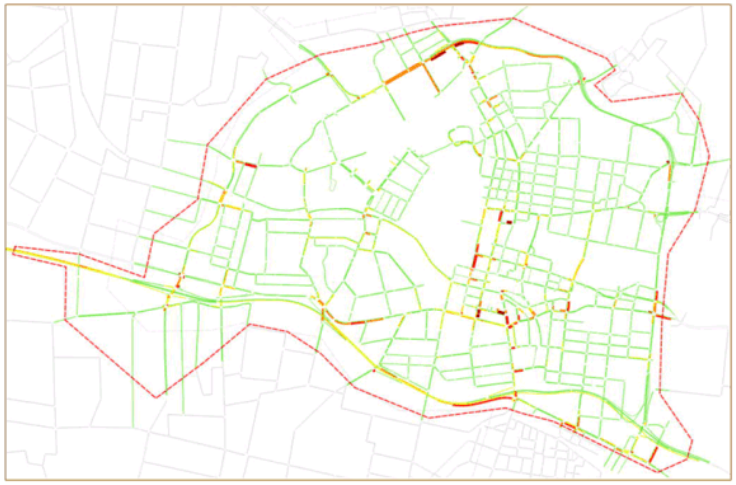


Figure B.6: 2026 Density plot, 4:45-5:00 PM

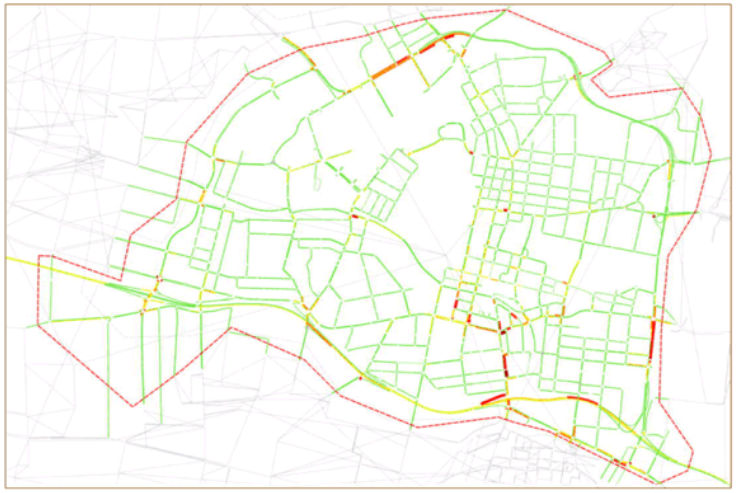


Figure B.7: 2016 Density plot, 4:45-5:00 PM

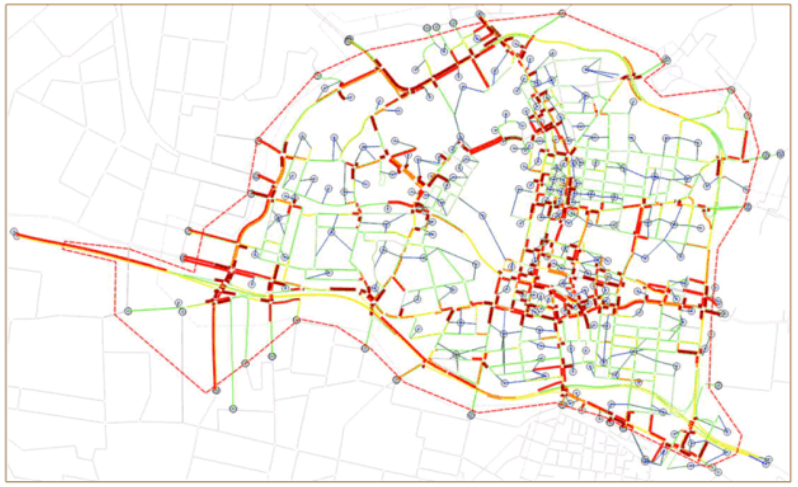


Figure B.8: 2026 Simulated Delay Time plot, 8:00-9:00 AM

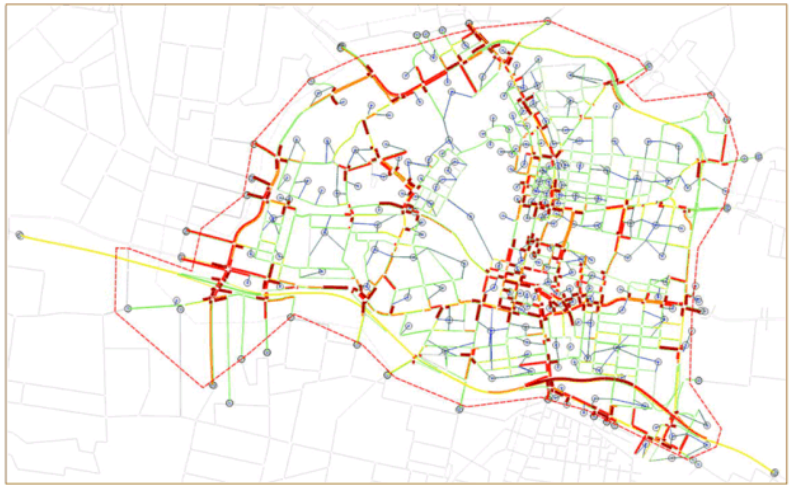


Figure B.9: 2016 Simulated Delay Time plot, 8:00-9:00 AM

Figure B.10: 2026 Simulated Delay Time plot, 5:00-6:00 PM

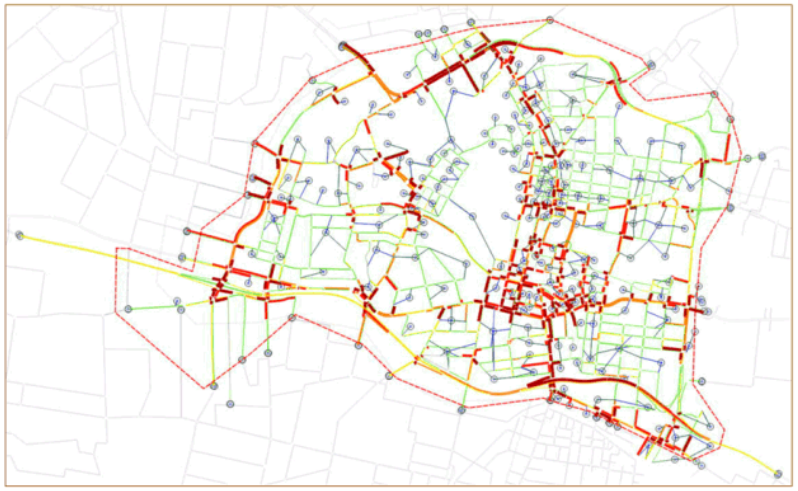


Figure B.11: 2016 Simulated Delay Time plot, 5:00-6:00 PM

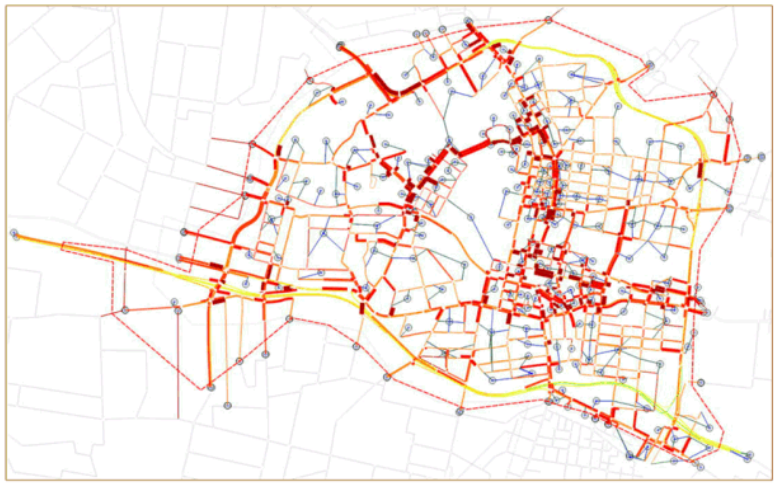


Figure B.12: 2026 Simulated Speed plot, 8:00-9:00 AM

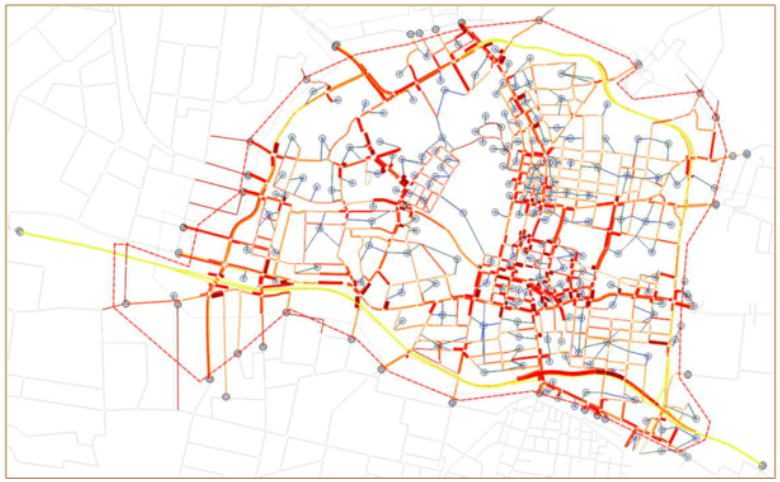


Figure B.13: 2016 Simulated Speed plot, 8:00-9:00 AM

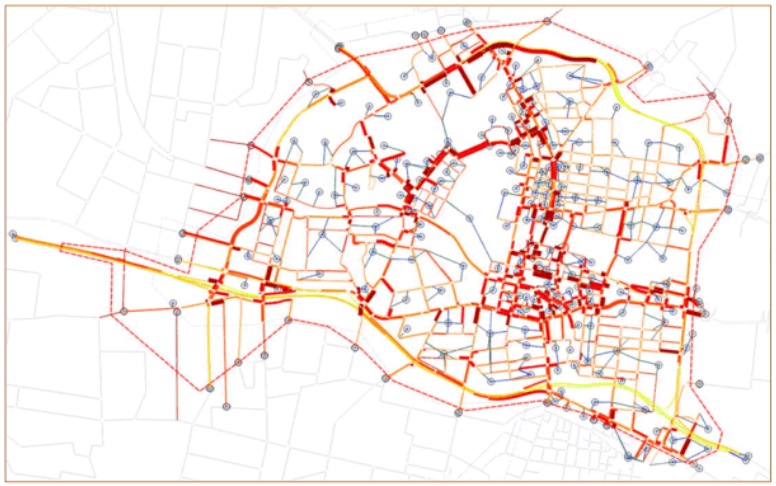


Figure B.14: 2026 Simulated Speed plot, 5:00-6:00 PM

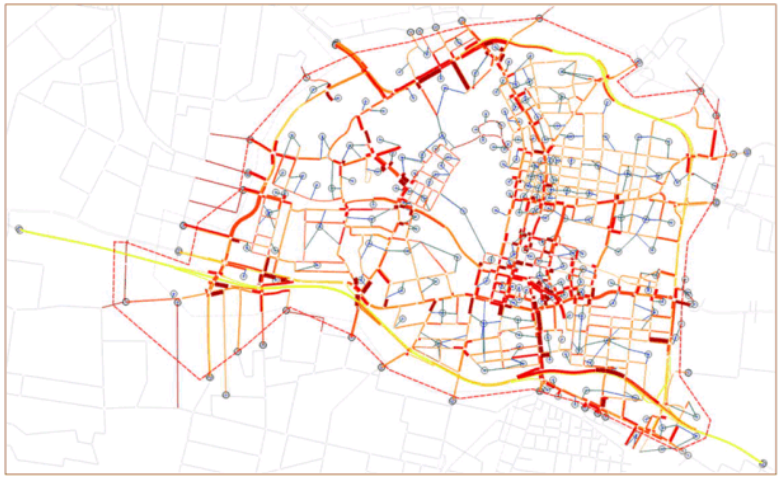


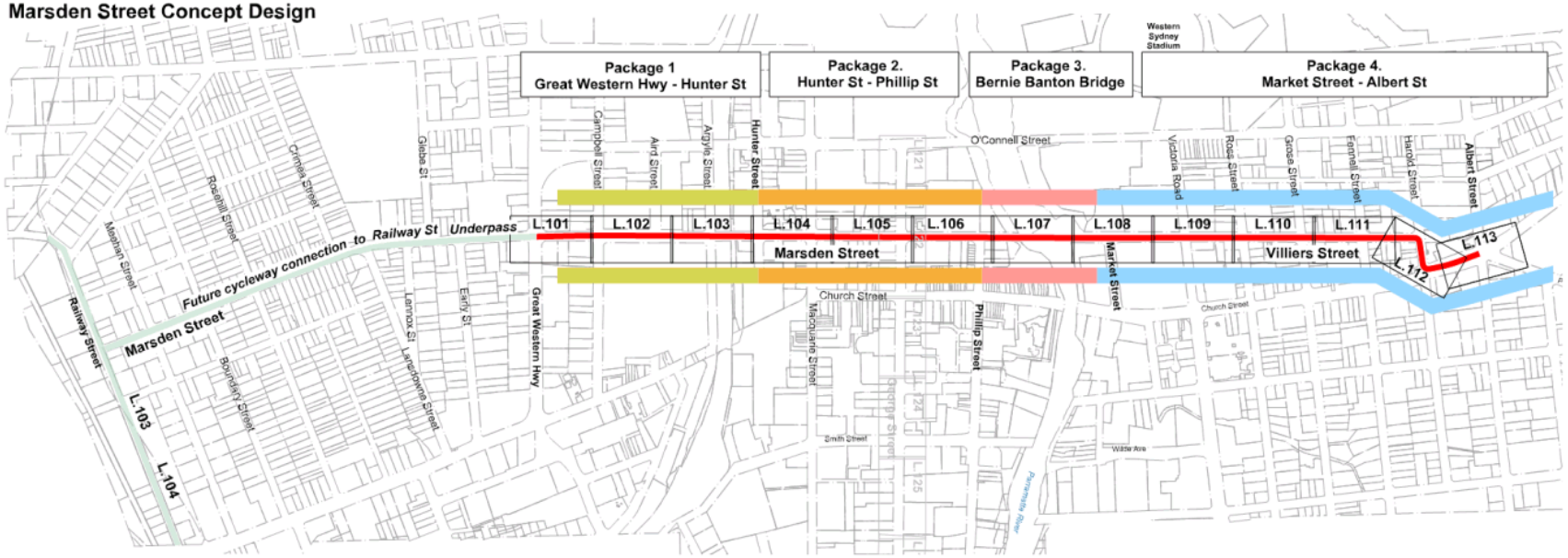
Figure B.15: 2016 Simulated Speed plot, 5:00-6:00 PM

Appendix C. CBD Cycleways – Marsden Street Concept Design

Council has developed high level concept plans to test the LRA and what would fit spatially within the Marsden Street corridor. The concept designs are subject to further design and community feedback. The Marsden Street Cycleway is a short term priority.

Parramatta CBD Cycleways

Marsden Street Concept Design



1 **Sheet Layout**
1 : 8000

DRAWING REGISTER

SHEET	TITLE	SCALE	ISSUE
L.000	COVER PAGE	1:8000 @ A3	J
MARSDEN STREET CYCLEWAY			
L.101	MARSDEN STREET	1:400 @ A3	J
L.102	MARSDEN STREET	1:400 @ A3	J
L.103	MARSDEN STREET	1:400 @ A3	J
L.104	MARSDEN STREET	1:400 @ A3	J
L.105	MARSDEN STREET	1:400 @ A3	J
L.106	MARSDEN STREET	1:400 @ A3	J
L.107	MARSDEN STREET	1:400 @ A3	J
L.108	MARSDEN STREET	1:400 @ A3	J
L.109	MARSDEN STREET	1:400 @ A3	J
L.110	MARSDEN STREET	1:400 @ A3	J
L.111	MARSDEN STREET	1:400 @ A3	J
L.112	MARSDEN STREET	1:400 @ A3	J
L.113	MARSDEN STREET	1:400 @ A3	J

FOR DISCUSSION

REV	DESCRIPTION	INITIAL	DATE
J	PRELIMINARY CONCEPT PLAN	MD/FM	07/04/21

NORTH

SCALE

NOTES:
THIS PLAN REPRESENTS THE OUTCOME OF PRELIMINARY INVESTIGATIONS INTO THE SPATIAL FEASIBILITY OF DELIVERING A SEPARATED CYCLEWAY ALONG THE NOMINATED STREETS. FURTHER INVESTIGATION IS REQUIRED TO DETERMINE OPERATIONAL FEASIBILITY AND TO DEVELOP THE DESIGN.

TRAFFIC ENGINEER
BITZIOS

HEAD CONSULTANT
spackman mossop michaels
LANDSCAPE ARCHITECTS

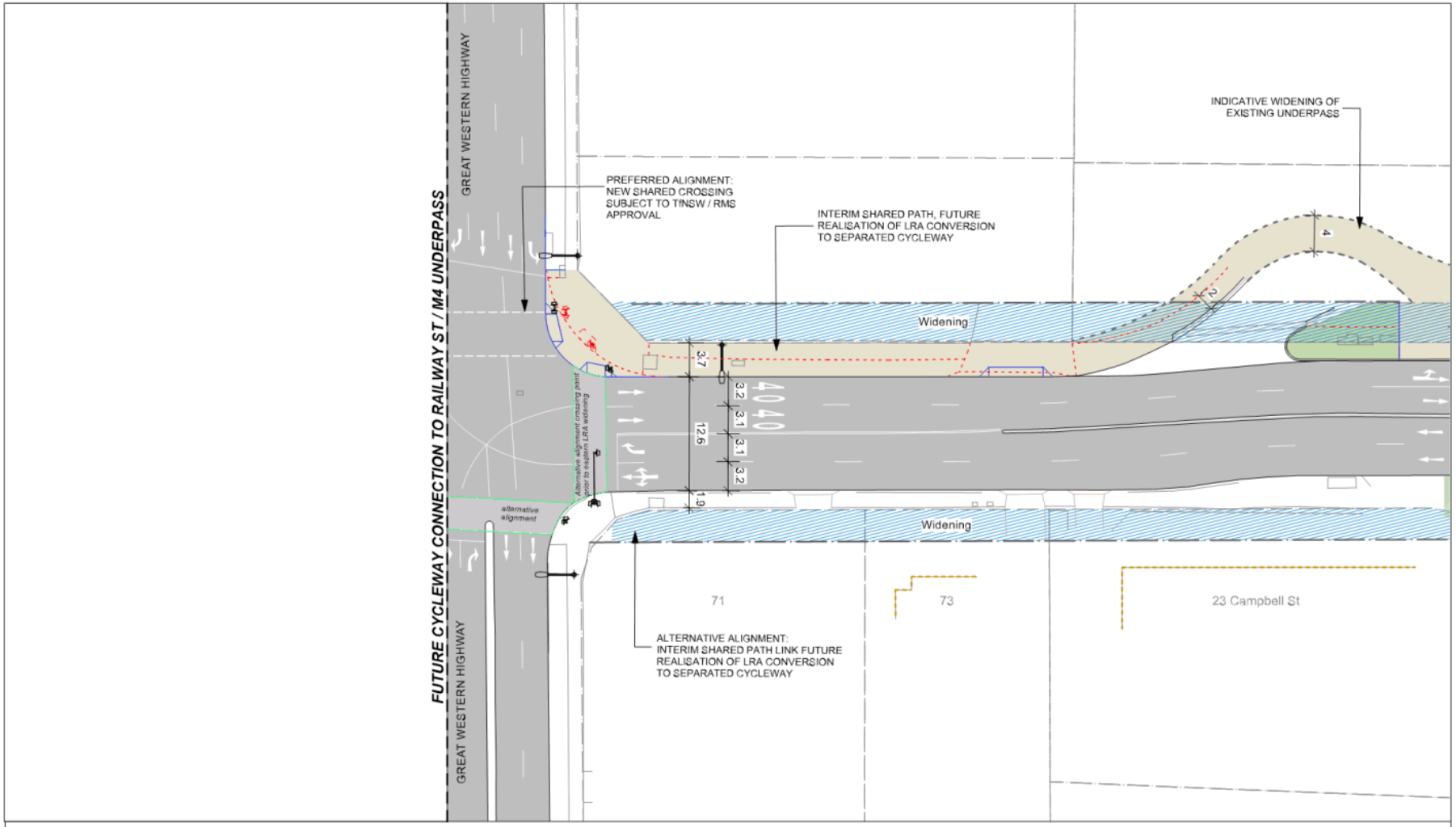
CLIENT
CITY OF PARRAMATTA

TITLE
MARSDEN STREET CYCLEWAY
Incl. Marist Pl, Villiers St & Harold St

DRAWING
Concept Design Plan

SHEET
L.000

REV
J


FUTURE CYCLEWAY CONNECTION TO RAILWAY ST / M4 UNDERPASS
GREAT WESTERN HIGHWAY
GREAT WESTERN HIGHWAY
PREFERRED ALIGNMENT: NEW SHARED CROSSING SUBJECT TO TfNSW / RMS APPROVAL
INTERIM SHARED PATH, FUTURE REALISATION OF LRA CONVERSION TO SEPARATED CYCLEWAY
INDICATIVE WIDENING OF EXISTING UNDERPASS
Widening
Widening
4040
3.7
3.2
3.1
12.6
3.1
3.2
1.9
4
2
alternative alignment
Alternative alignment crossing point prior to explore LRA widening
71
73
23 Campbell St
ALTERNATIVE ALIGNMENT: INTERIM SHARED PATH LINK FUTURE REALISATION OF LRA CONVERSION TO SEPARATED CYCLEWAY
KEY
Existing kerb
Existing building line
Existing/relocated parking
Existing traffic signal pole
Existing power/ light post
Item removed
New kerbs / kerb ramps
New cycleway
Existing street tree retained
Existing street tree removed
New street tree
New pavement
New threshold
New planting / turf
Land Reservation (LRA)
Active planning proposal
Heritage
FOR DISCUSSION
J PRELIMINARY CONCEPT PLAN MD/FM 07/04/21
REV DESCRIPTION INITIAL DATE
NORTH
SCALE
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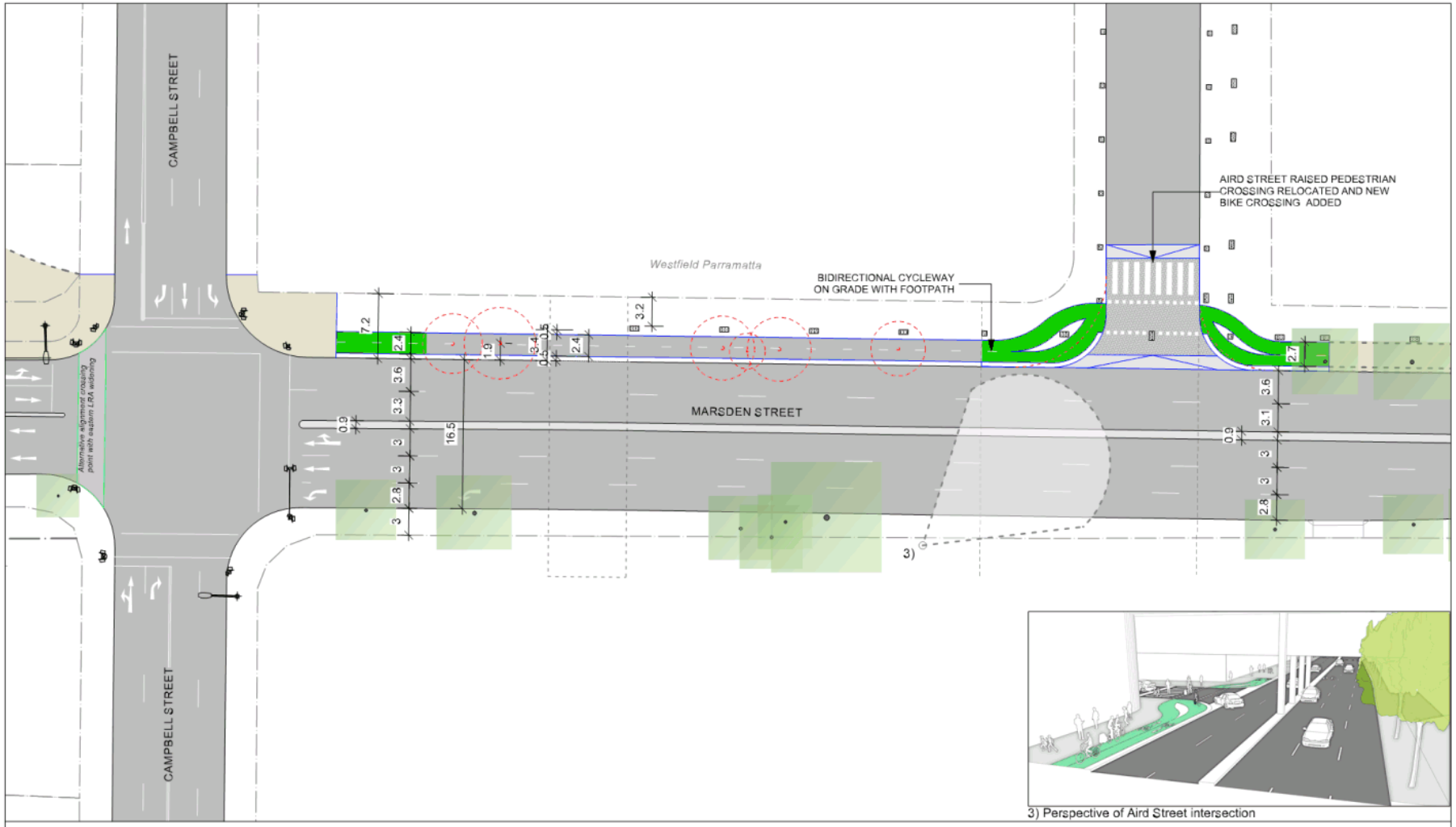
TRAFFIC ENGINEER
BITZIOS
HEAD CONSULTANT
spackman mossop michaels
LANDSCAPE ARCHITECTS
CLIENT
CITY OF PARRAMATTA
TITLE
MARSDEN STREET CYCLEWAY
Incl. Marist Pl, Villiers St & Harold St
DRAWING
Concept Design Plan
SHEET
L.101
REV
J



3) Perspective of Aird Street intersection

KEY

- Existing kerb
- Existing building line
- Existing/relocated parking
- Existing traffic signal pole
- Existing power/ light post
- Item removed
- New kerbs / kerb ramps
- New cycleway
- Existing street tree retained
- Existing street tree removed
- New street tree
- New pavement
- New threshold
- New planting / turf
- Land Reservation (LRA)
- Active planning proposal
- Heritage

FOR DISCUSSION

REV	DESCRIPTION	INITIAL	DATE
3	PRELIMINARY CONCEPT PLAN	MD/FM	07/04/21

NORTH

SCALE

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TRAFFIC ENGINEER: BITZIOS

HEAD CONSULTANT: spackman mossop michaels — LANDSCAPE ARCHITECTS

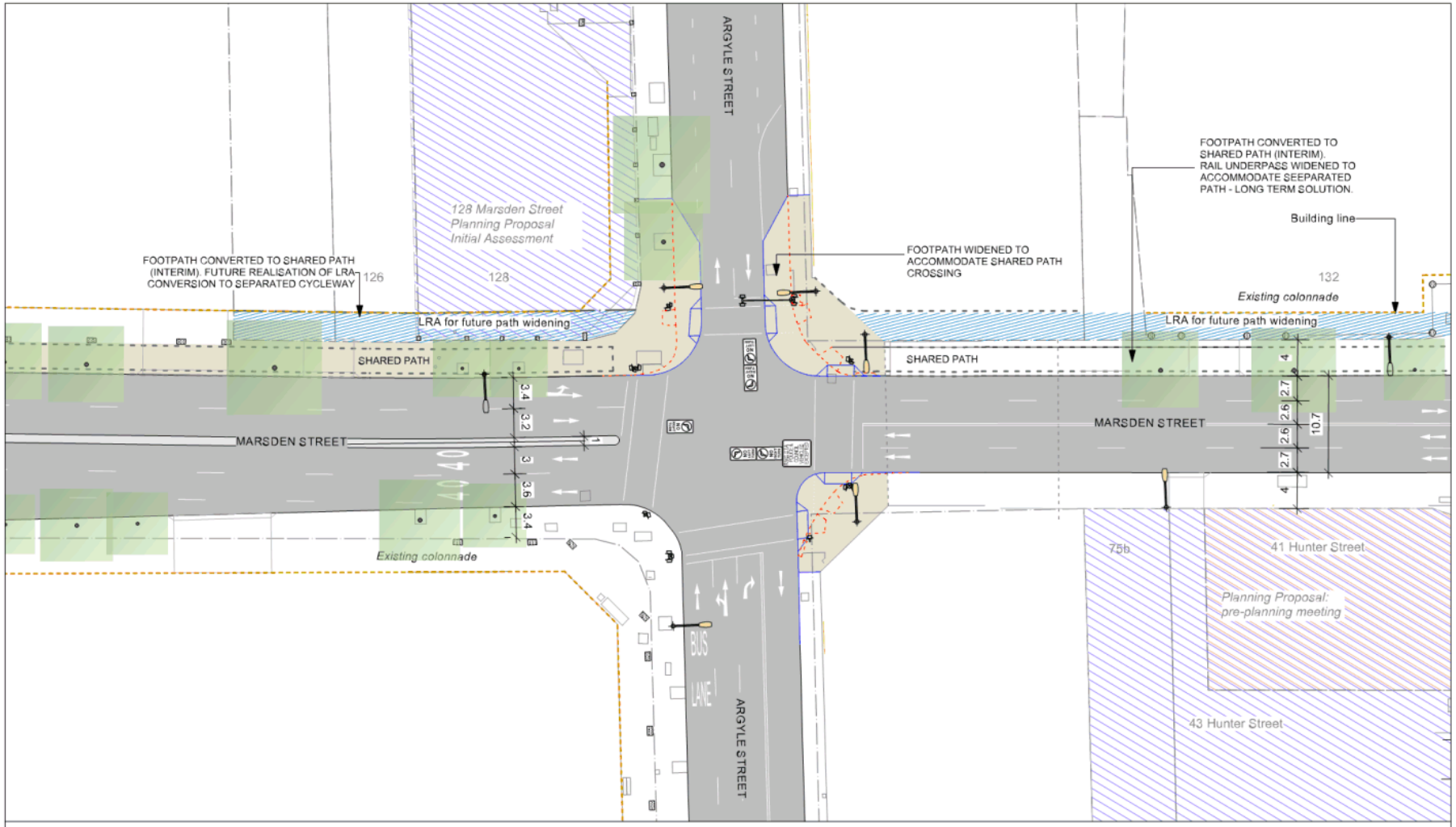
CLIENT: CITY OF PARRAMATTA

TITLE: MARSDEN STREET CYCLEWAY
Incl. Marist Pl, Villiers St & Harold St

DRAWING: Concept Design Plan

SHEET: L.102

REV: J


ARGYLE STREET
128 Marsden Street
Planning Proposal
Initial Assessment
FOOTPATH CONVERTED TO SHARED PATH (INTERIM). FUTURE REALISATION OF LRA CONVERSION TO SEPARATED CYCLEWAY
126
128
LRA for future path widening
SHARED PATH
MARSDEN STREET
Existing colonnade
FOOTPATH WIDENED TO ACCOMMODATE SHARED PATH CROSSING
FOOTPATH CONVERTED TO SHARED PATH (INTERIM). RAIL UNDERPASS WIDENED TO ACCOMMODATE SEEPARATED PATH - LONG TERM SOLUTION.
Building line
132
Existing colonnade
LRA for future path widening
SHARED PATH
MARSDEN STREET
75b
41 Hunter Street
Planning Proposal:
pre-planning meeting
43 Hunter Street
BUS LANE
ARGYLE STREET
KEY
Existing kerb
Existing building line
Existing/relocated parking
Existing traffic signal pole
Existing power/ light post
Item removed
New kerbs / kerb ramps
New cycleway
Existing street tree retained
Existing street tree removed
New street tree
New pavement
New threshold
New planting / turf
Land Reservation (LRA)
Active planning proposal
Heritage
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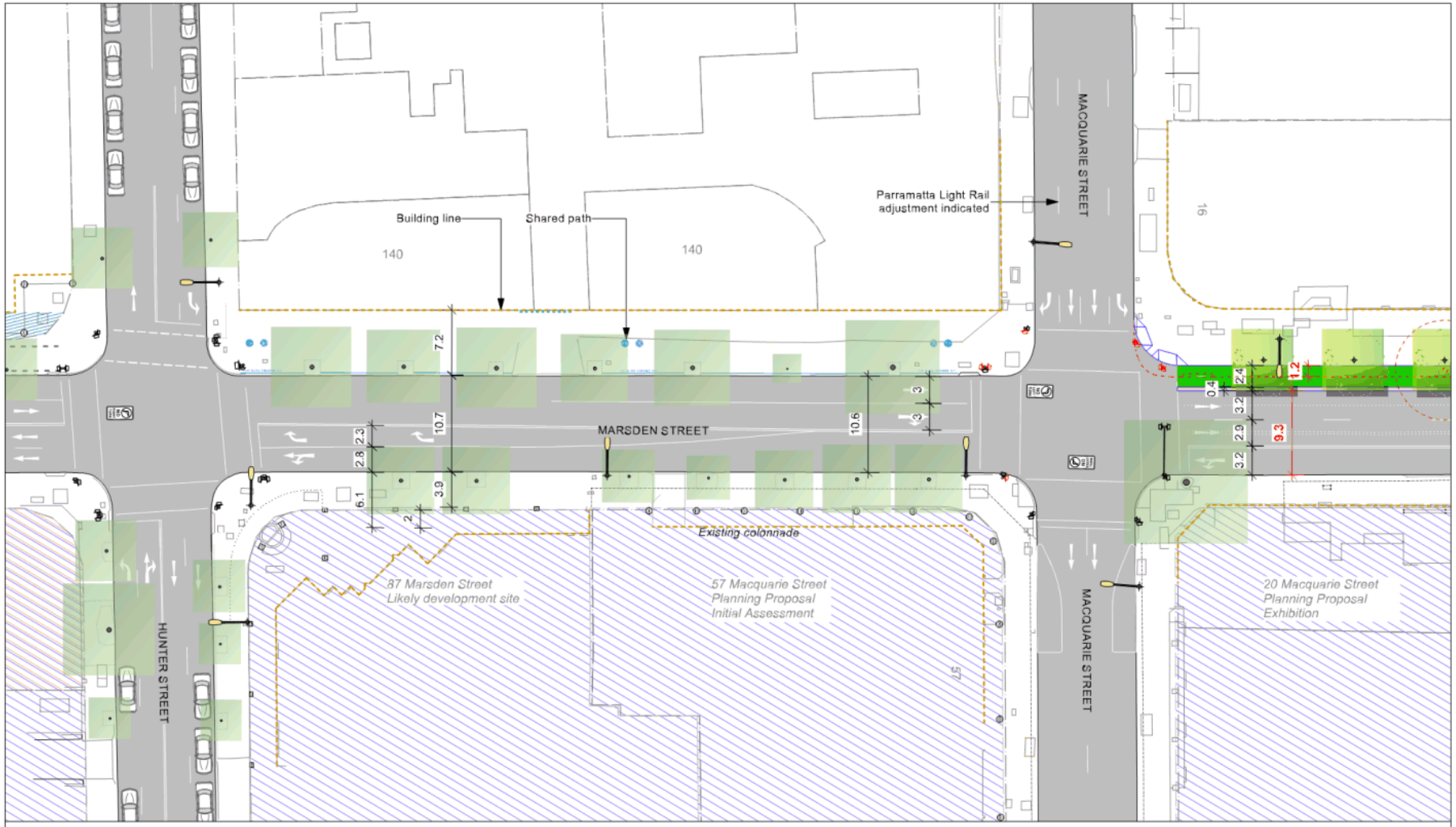
TRAFFIC ENGINEER
BITZIOS
HEAD CONSULTANT
spackman mossop michaels
LANDSCAPE ARCHITECTS
CLIENT
CITY OF PARRAMATTA
TITLE
MARSDEN STREET CYCLEWAY
Incl. Marist Pl, Villiers St & Harold St
DRAWING
Concept Design Plan
SHEET
L.103
REV
J


Building line
Shared path
Parramatta Light Rail adjustment indicated
MACQUARIE STREET
MARSDEN STREET
HUNTER STREET
140
140
16
57
Existing colonnade
87 Marsden Street
Likely development site
57 Macquarie Street
Planning Proposal
Initial Assessment
20 Macquarie Street
Planning Proposal
Exhibition
7.2
10.7
10.6
2.3
2.8
6.1
3.9
2
3
3
0.4
2.4
1.2
3.2
2.9
9.3
3.2
KEY
Existing kerb
Existing building line
Existing/relocated parking
Existing traffic signal pole
Existing power/ light post
Item removed
New kerbs / kerb ramps
New cycleway
Existing street tree retained
Existing street tree removed
New street tree
New pavement
New threshold
New planting / turf
Land Reservation (LRA)
Active planning proposal
Heritage
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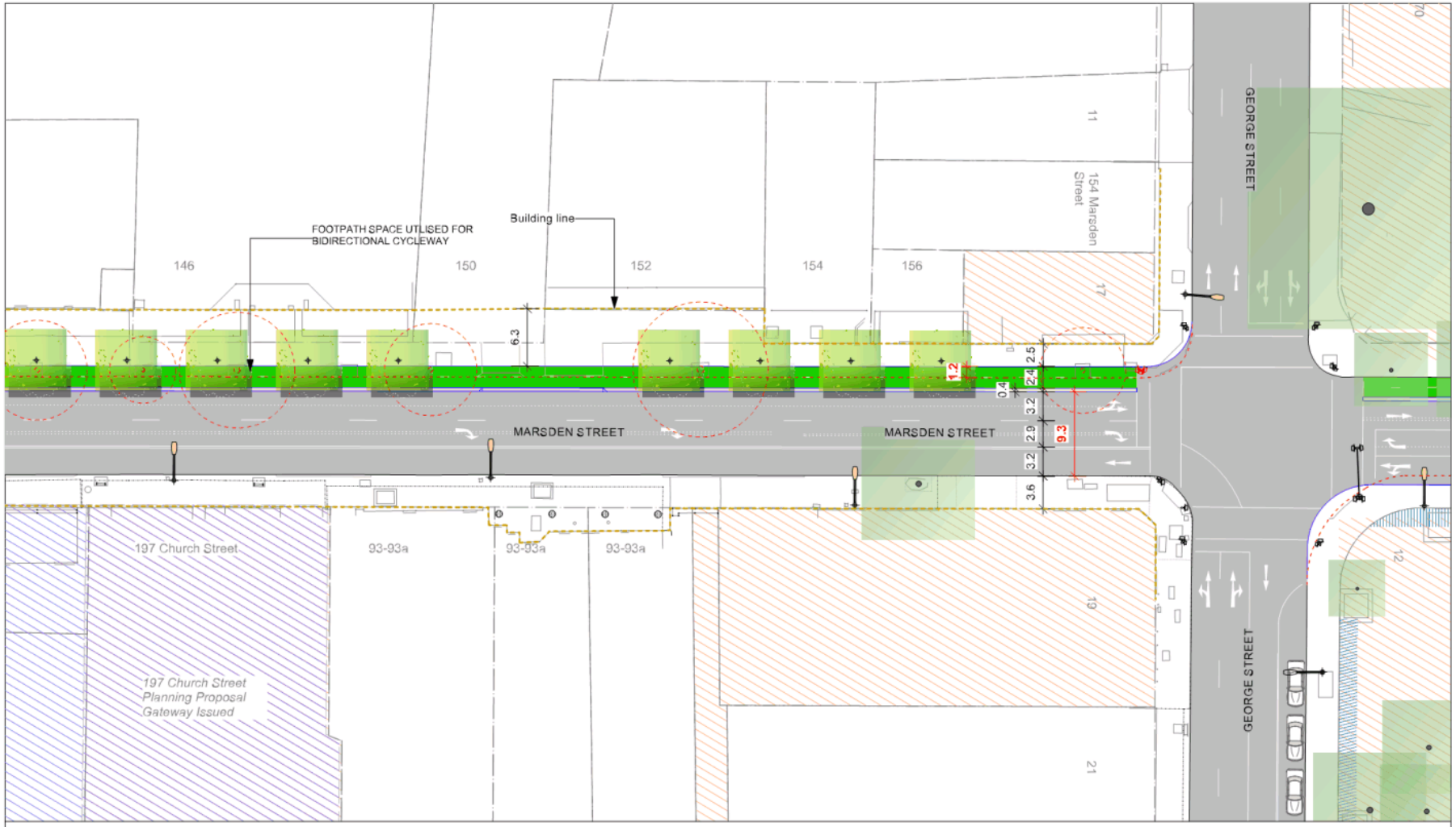
TRAFFIC ENGINEER
BITZIOS
HEAD CONSULTANT
spackman mossop michaels
LANDSCAPE ARCHITECTS
CLIENT
CITY OF PARRAMATTA
TITLE
MARSDEN STREET CYCLEWAY
Incl. Marist Pl, Villiers St & Harold St
DRAWING
Concept Design Plan
SHEET
L.104
REV
J


FOOTPATH SPACE UTLISED FOR BIDIRECTIONAL CYCLEWAY
Building line
146
150
152
154
156
154 Marsden Street
11
17
19
21
12
GEORGE STREET
MARSDEN STREET
MARSDEN STREET
6.3
1.2
0.4
2.5
2.4
3.2
2.9
3.2
3.6
9.3
197 Church Street
93-93a
93-93a
93-93a
197 Church Street
Planning Proposal
Gateway Issued
KEY
Existing kerb
Existing building line
Existing/relocated parking
Existing traffic signal pole
Existing power/ light post
Item removed
New kerbs / kerb ramps
New cycleway
Existing street tree retained
Existing street tree removed
New street tree
New pavement
New threshold
New planting / turf
Land Reservation (LRA)
Active planning proposal
Heritage
FOR DISCUSSION
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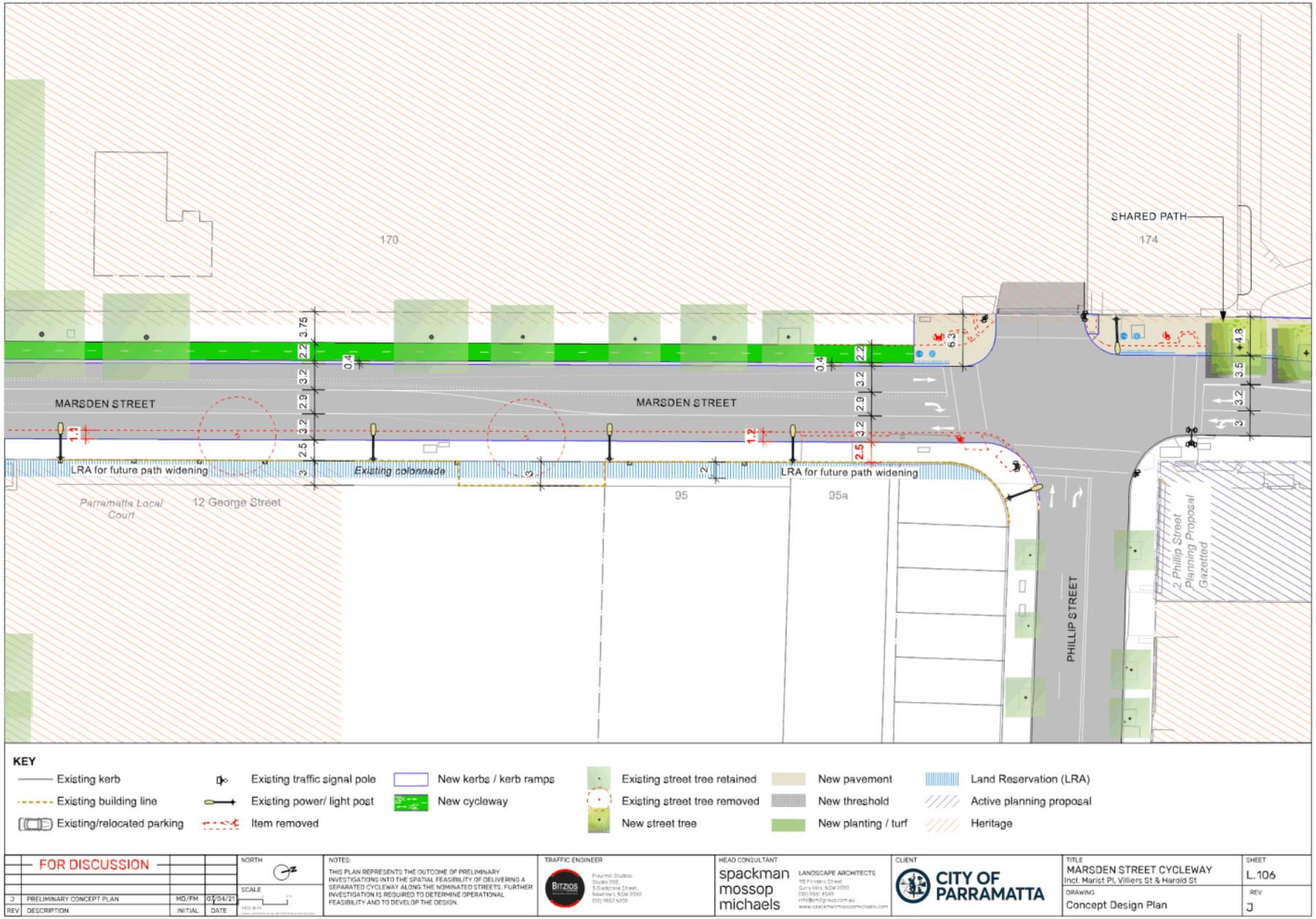
TRAFFIC ENGINEER
BITZIOS
HEAD CONSULTANT
spackman mossop michaels
LANDSCAPE ARCHITECTS
CLIENT
CITY OF PARRAMATTA
TITLE
MARSDEN STREET CYCLEWAY
Incl. Marist Pl, Villiers St & Harold St
SHEET
L.105
DRAWING
Concept Design Plan
REV
J


SHARED PATH
174
170
MARSDEN STREET
MARSDEN STREET
LRA for future path widening
Existing colonnade
LRA for future path widening
Parramatta Local Court
12 George Street
95
95a
PHILLIP STREET
2 Phillip Street Planning Proposal Gazetted
KEY
Existing kerb
Existing building line
Existing/relocated parking
Existing traffic signal pole
Existing power/ light post
Item removed
New kerbs / kerb ramps
New cycleway
Existing street tree retained
Existing street tree removed
New street tree
New pavement
New threshold
New planting / turf
Land Reservation (LRA)
Active planning proposal
Heritage
FOR DISCUSSION
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NORTH
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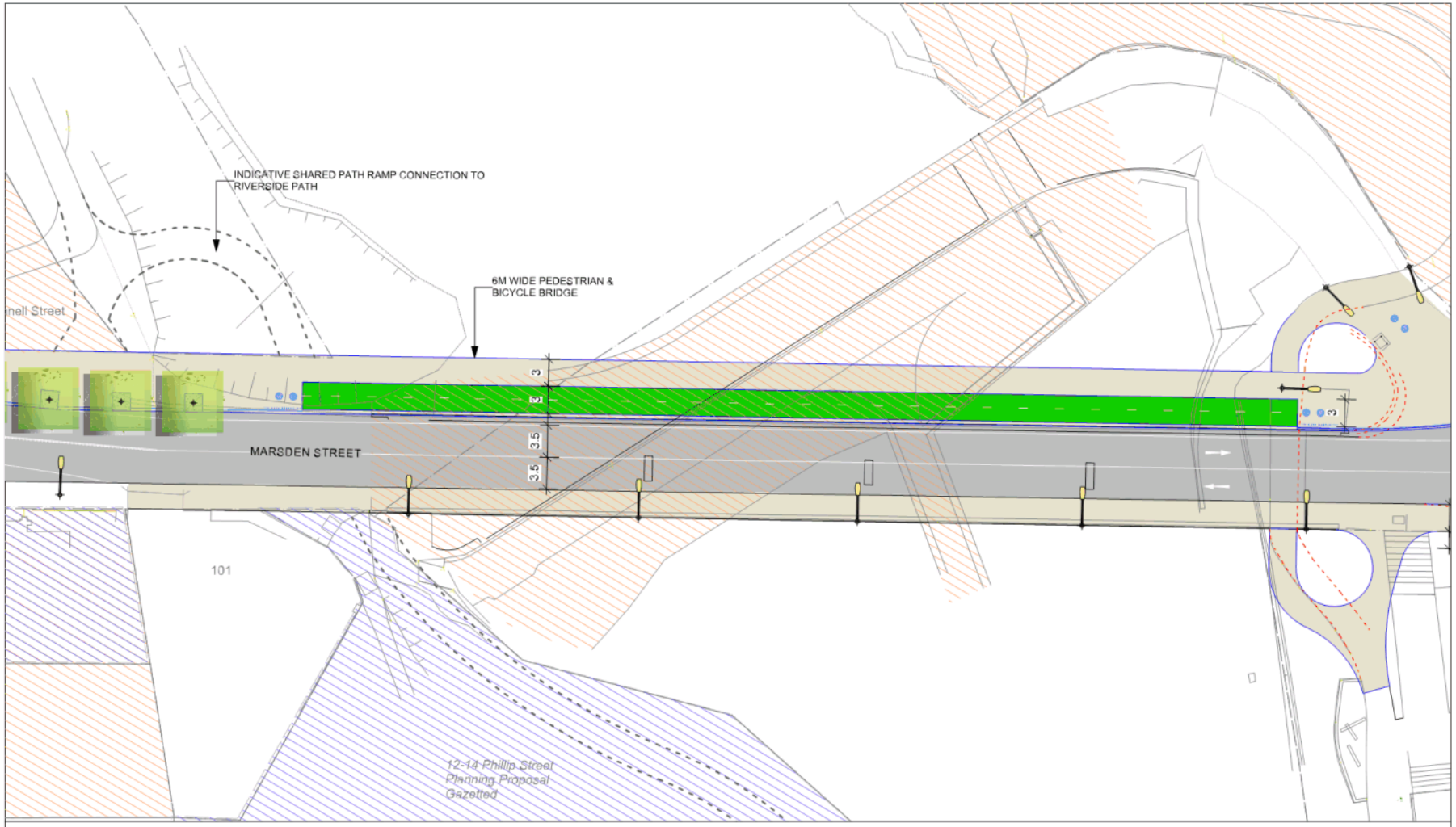
TRAFFIC ENGINEER
BITZIOS
HEAD CONSULTANT
spackman mossop michaels
LANDSCAPE ARCHITECTS
CLIENT
CITY OF PARRAMATTA
TITLE
MARSDEN STREET CYCLEWAY
Incl. Marist Pl, Villiers St & Harold St
DRAWING
Concept Design Plan
SHEET
L.106
REV
J


INDICATIVE SHARED PATH RAMP CONNECTION TO RIVERSIDE PATH
6M WIDE PEDESTRIAN & BICYCLE BRIDGE
MARSDEN STREET
3
3
3.5
3.5
3
101
12-14 Phillip Street Planning Proposal Gazetted
KEY
Existing kerb
Existing building line
Existing/relocated parking
Existing traffic signal pole
Existing power/ light post
Item removed
New kerbs / kerb ramps
New cycleway
Existing street tree retained
Existing street tree removed
New street tree
New pavement
New threshold
New planting / turf
Land Reservation (LRA)
Active planning proposal
Heritage
FOR DISCUSSION
J PRELIMINARY CONCEPT PLAN MD/FM 07/04/21
REV DESCRIPTION INITIAL DATE
NORTH
SCALE
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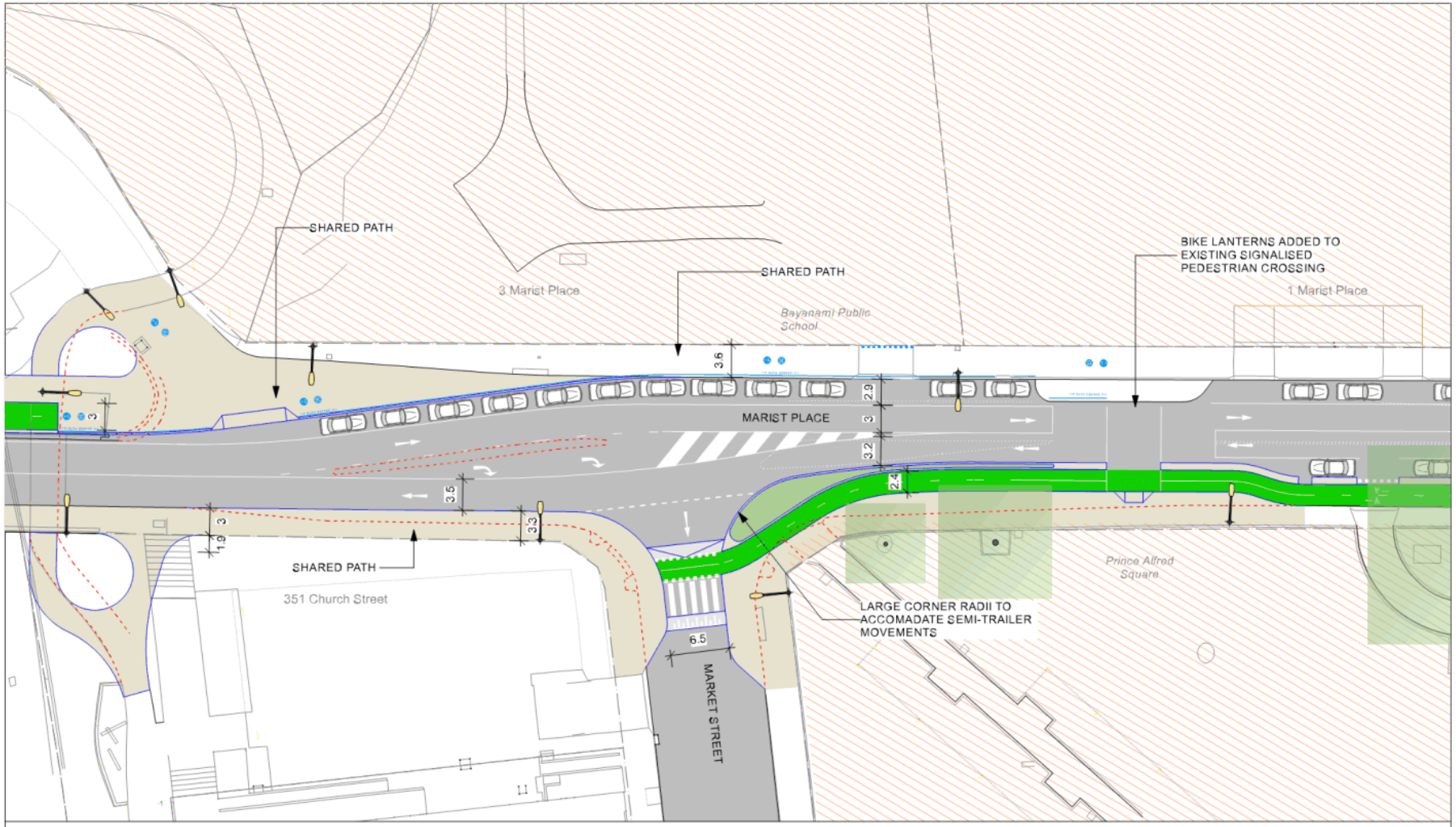
TRAFFIC ENGINEER
BITZIOS
HEAD CONSULTANT
spackman mossop michaels
LANDSCAPE ARCHITECTS
CLIENT
CITY OF PARRAMATTA
TITLE
MARSDEN STREET CYCLEWAY
Incl. Marist Pl, Villiers St & Harold St
DRAWING
Concept Design Plan
SHEET
L.107
REV
J


SHARED PATH
3 Marist Place
SHARED PATH
Bayanami Public School
BIKE LANTERNS ADDED TO EXISTING SIGNALISED PEDESTRIAN CROSSING
1 Marist Place
MARIST PLACE
3.9
2.9
3
3.2
2.4
3.5
3.3
1.9
3
SHARED PATH
351 Church Street
Prince Alfred Square
LARGE CORNER RADII TO ACCOMADATE SEMI-TRAILER MOVEMENTS
6.5
MARKET STREET
KEY
Existing kerb
Existing building line
Existing/relocated parking
Existing traffic signal pole
Existing power/ light post
Item removed
New kerbs / kerb ramps
New cycleway
Existing street tree retained
Existing street tree removed
New street tree
New pavement
New threshold
New planting / turf
Land Reservation (LRA)
Active planning proposal
Heritage
FOR DISCUSSION
J PRELIMINARY CONCEPT PLAN MD/FM 07/04/21
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NORTH
SCALE
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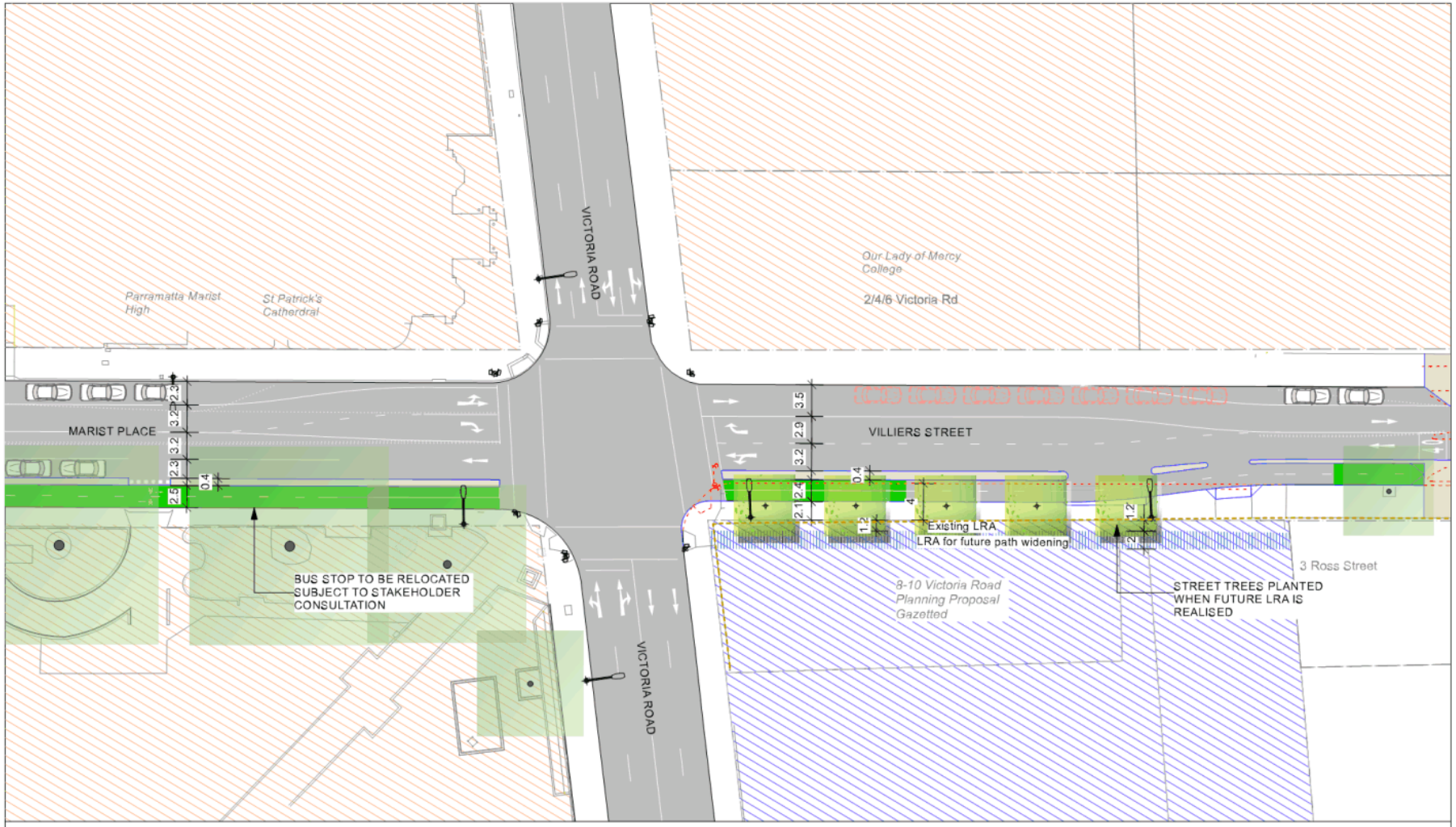
TRAFFIC ENGINEER
BITZIOS
HEAD CONSULTANT
spackman mossop michaels
LANDSCAPE ARCHITECTS
CLIENT
CITY OF PARRAMATTA
TITLE
MARSDEN STREET CYCLEWAY
Incl. Marist Pl, Villiers St & Harold St
DRAWING
Concept Design Plan
SHEET
L.108
REV
J


VICTORIA ROAD
Parramatta Marist High
St Patrick's Catherdral
Our Lady of Mercy College
2/4/6 Victoria Rd
MARIST PLACE
VILLIERS STREET
BUS STOP TO BE RELOCATED SUBJECT TO STAKEHOLDER CONSULTATION
Existing LRA
LRA for future path widening
3 Ross Street
8-10 Victoria Road Planning Proposal Gazetted
STREET TREES PLANTED WHEN FUTURE LRA IS REALISED
VICTORIA ROAD
KEY
Existing kerb
Existing building line
Existing/relocated parking
Existing traffic signal pole
Existing power/ light post
Item removed
New kerbs / kerb ramps
New cycleway
Existing street tree retained
Existing street tree removed
New street tree
New pavement
New threshold
New planting / turf
Land Reservation (LRA)
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FOR DISCUSSION
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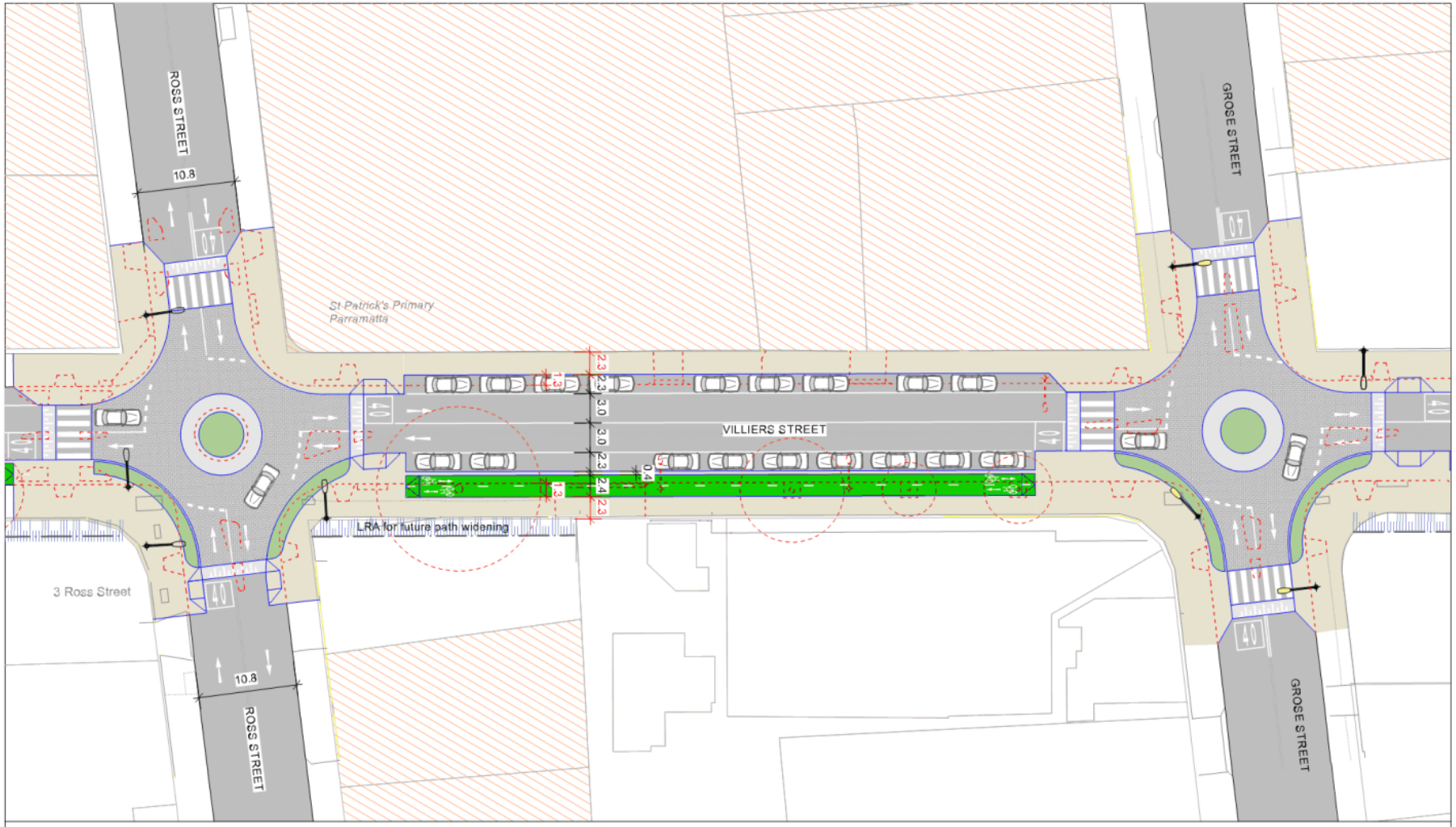
TRAFFIC ENGINEER
BITZIOS
HEAD CONSULTANT
spackman mossop michaels
LANDSCAPE ARCHITECTS
CLIENT
CITY OF PARRAMATTA
TITLE
MARSDEN STREET CYCLEWAY
Incl. Marist Pl, Villiers St & Harold St
DRAWING
Concept Design Plan
SHEET
L.109
REV
J


ROSS STREET
10.8
GROSE STREET
St Patrick's Primary Parramatta
VILLIERS STREET
LRA for future path widening
3 Ross Street
10.8
ROSS STREET
GROSE STREET
KEY
Existing kerb
Existing trees
Existing/relocated parking
Existing light post
Existing traffic signal pole
Item removed
New kerbs / kerb ramps / medians
New street tree
New cycleway
New pavement
New threshold
New planting / turf
Land Reservation (LRA)
Active planning proposal
Heritage
ALTERNATIVE CONCEPT DESIGN
FOR DISCUSSION
3 PRELIMINARY CONCEPT PLAN MD/FM 07/04/21
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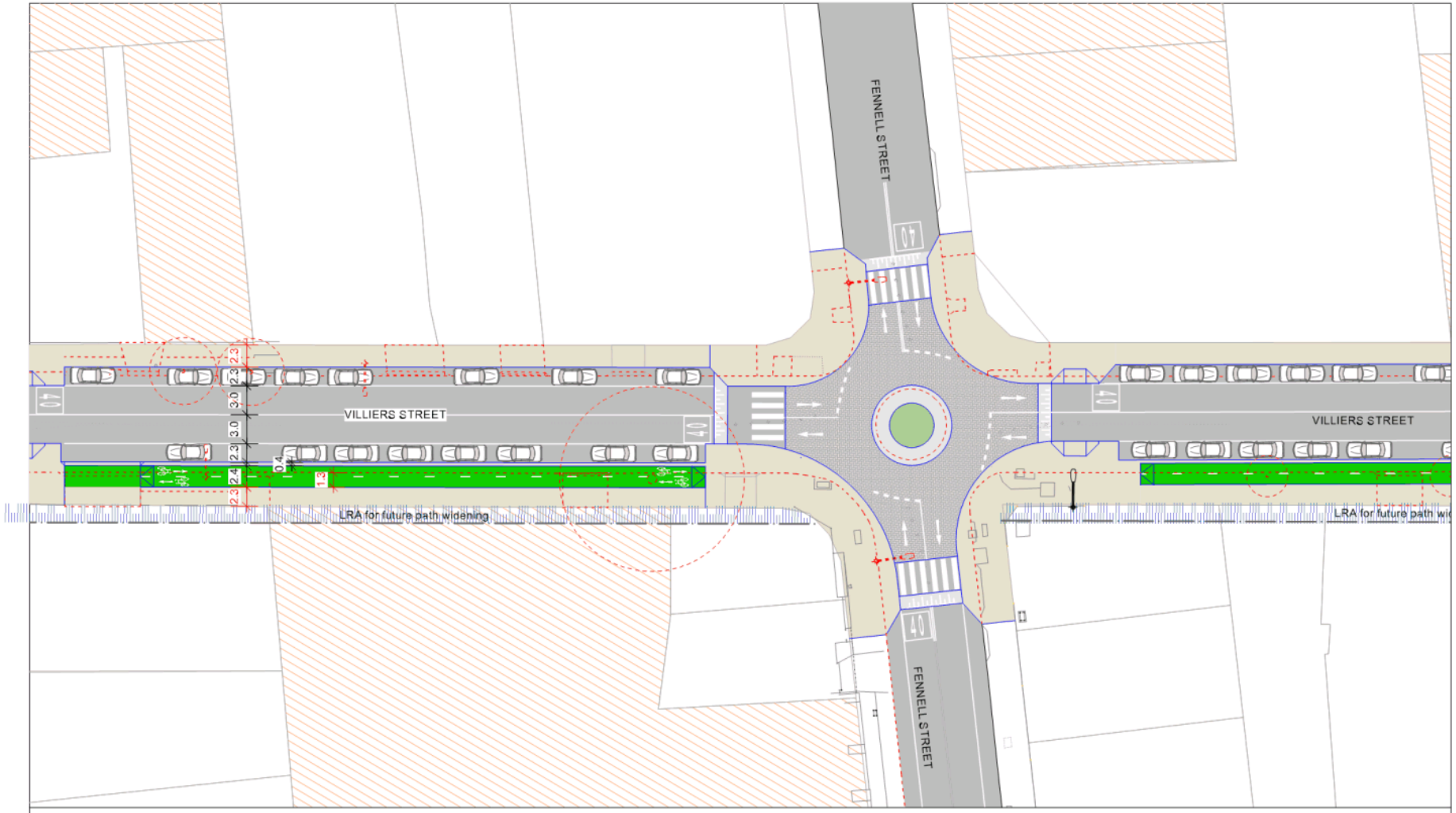
TRAFFIC ENGINEER
BITZIOS
HEAD CONSULTANT
spackman mossop michaels
LANDSCAPE ARCHITECTS
CLIENT
CITY OF PARRAMATTA
TITLE
MARSDEN STREET CYCLEWAY
Incl. Marist Pl, Villiers St & Harold St
DRAWING
Concept Design Plan
SHEET
L.110-A
REV
J


FENNELL STREET
VILLIERS STREET
VILLIERS STREET
LRA for future path widening
LRA for future path wi
FENNELL STREET
KEY
Existing kerb
Existing trees
Existing/relocated parking
Existing light post
Existing traffic signal pole
Item removed
New kerbs / kerb ramps / medians
New street tree
New cycleway
New pavement
New threshold
New planting / turf
Land Reservation (LRA)
Active planning proposal
Heritage
ALTERNATIVE CONCEPT DESIGN
FOR DISCUSSION
J PRELIMINARY CONCEPT PLAN MD/FM 07/04/21
REV DESCRIPTION INITIAL DATE
NORTH
SCALE
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TRAFFIC ENGINEER
BITZIOS
HEAD CONSULTANT
spackman mossop michaels
LANDSCAPE ARCHITECTS
CLIENT
CITY OF PARRAMATTA
TITLE
MARSDEN STREET CYCLEWAY
Incl. Marist Pl, Villiers St & Harold St
DRAWING
Concept Design Plan
SHEET
L.111-A
REV
J

HAROLD STREET
VILLIERS STREET
LRA for future path widening
17 Harold Street
439-441 Church Street
459-463 Church Street
Light Rail
Shared Path
478 Church Street
CHURCH STREET
476 Church Street
2.3
3.5
3
KEY
Existing kerb
Existing trees
Existing/relocated parking
Existing light post
Existing traffic signal pole
Item removed
New kerbs / kerb ramps / medians
New street tree
New cycleway
New pavement
New threshold
New planting / turf
Land Reservation (LRA)
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SHEET
L.112-A
DRAWING
Concept Design Plan
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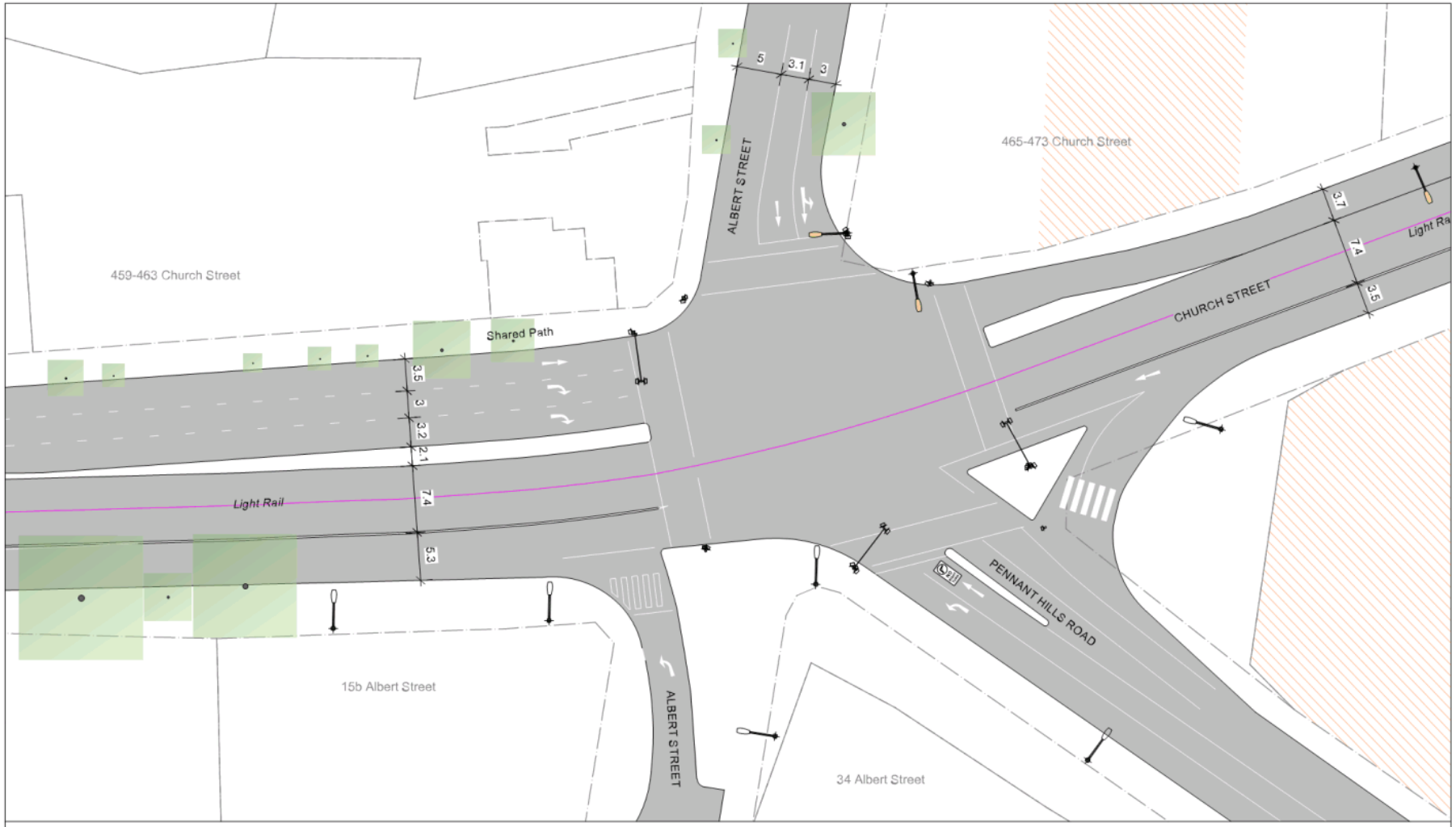
459-463 Church Street
465-473 Church Street
15b Albert Street
34 Albert Street
ALBERT STREET
CHURCH STREET
PENNANT HILLS ROAD
Shared Path
Light Rail
5
3.1
3
3.5
3
3.2
2.1
7.4
5.3
3.7
7.4
3.5
KEY
Existing kerb
Existing building line
Existing/relocated parking
Existing traffic signal pole
Existing power/ light post
Item removed
New kerbs / kerb ramps
New cycleway
Existing street tree retained
Existing street tree removed
New street tree
New pavement
New threshold
New planting / turf
Land Reservation (LRA)
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Heritage
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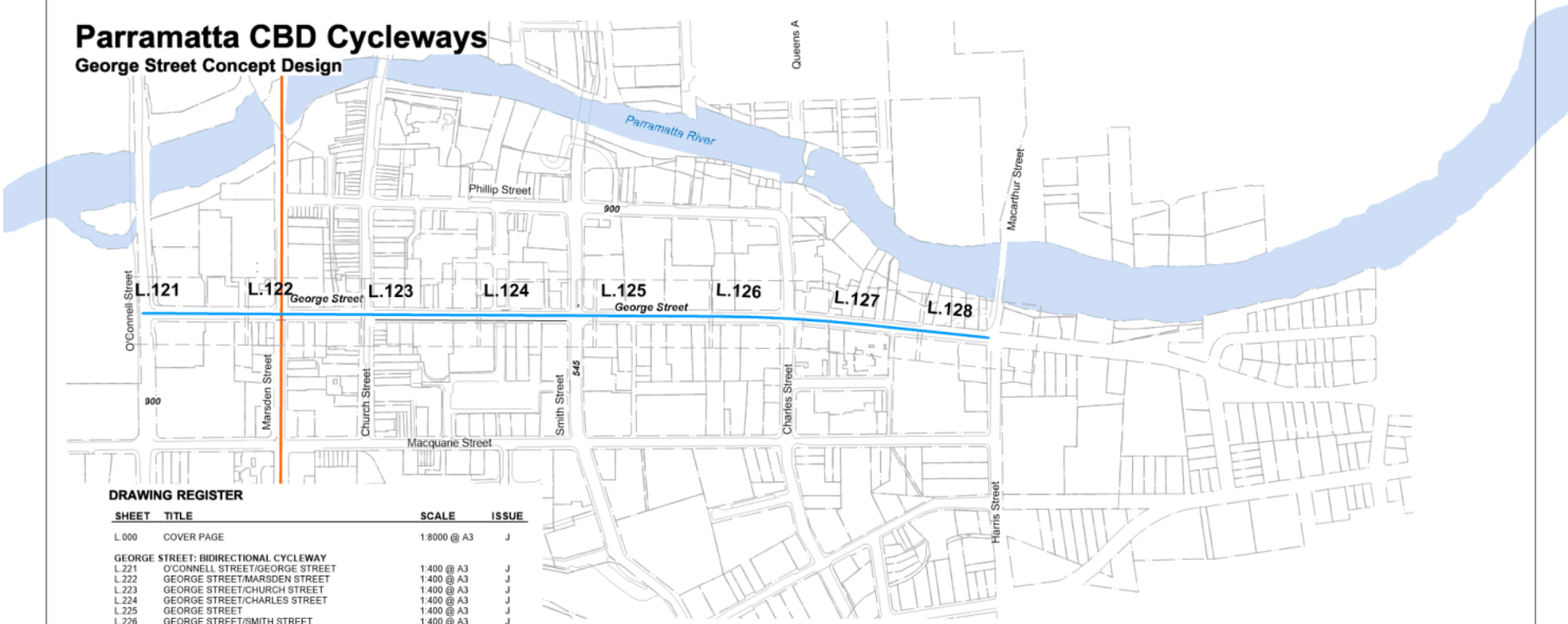
BITZIOS
HEAD CONSULTANT
spackman mossop michaels
LANDSCAPE ARCHITECTS
CLIENT
CITY OF PARRAMATTA
TITLE
MARSDEN STREET CYCLEWAY
Incl. Marist Pl, Villiers St & Harold St
DRAWING
Concept Design Plan
SHEET
L.113
REV
J

Appendix D. CBD Cycleways – George Street Concept Design

Council has developed high level concept plans to test the LRA and what would fit spatially within the George Street corridor. The concept designs are subject to further design and community feedback. The George Street Cycleway can be delivered in the medium or long term.

Parramatta CBD Cycleways

George Street Concept Design



DRAWING REGISTER

SHEET	TITLE	SCALE	ISSUE
L.000	COVER PAGE	1:8000 @ A3	J
	GEORGE STREET: BIDIRECTIONAL CYCLEWAY		
L.221	O'CONNELL STREET/GEORGE STREET	1:400 @ A3	J
L.222	GEORGE STREET/MARSDEN STREET	1:400 @ A3	J
L.223	GEORGE STREET/CHURCH STREET	1:400 @ A3	J
L.224	GEORGE STREET/CHARLES STREET	1:400 @ A3	J
L.225	GEORGE STREET	1:400 @ A3	J
L.226	GEORGE STREET/SMITH STREET	1:400 @ A3	J
L.227	GEORGE STREET	1:400 @ A3	J
L.228	GEORGE STREET/MACARTHUR STREET	1:400 @ A3	J

1 Sheet Layout
1 : 8000

FOR DISCUSSION

REV	DESCRIPTION	INITIAL	DATE
J	PRELIMINARY CONCEPT PLAN	MD/FM	08/04/21

NORTH

SCALE

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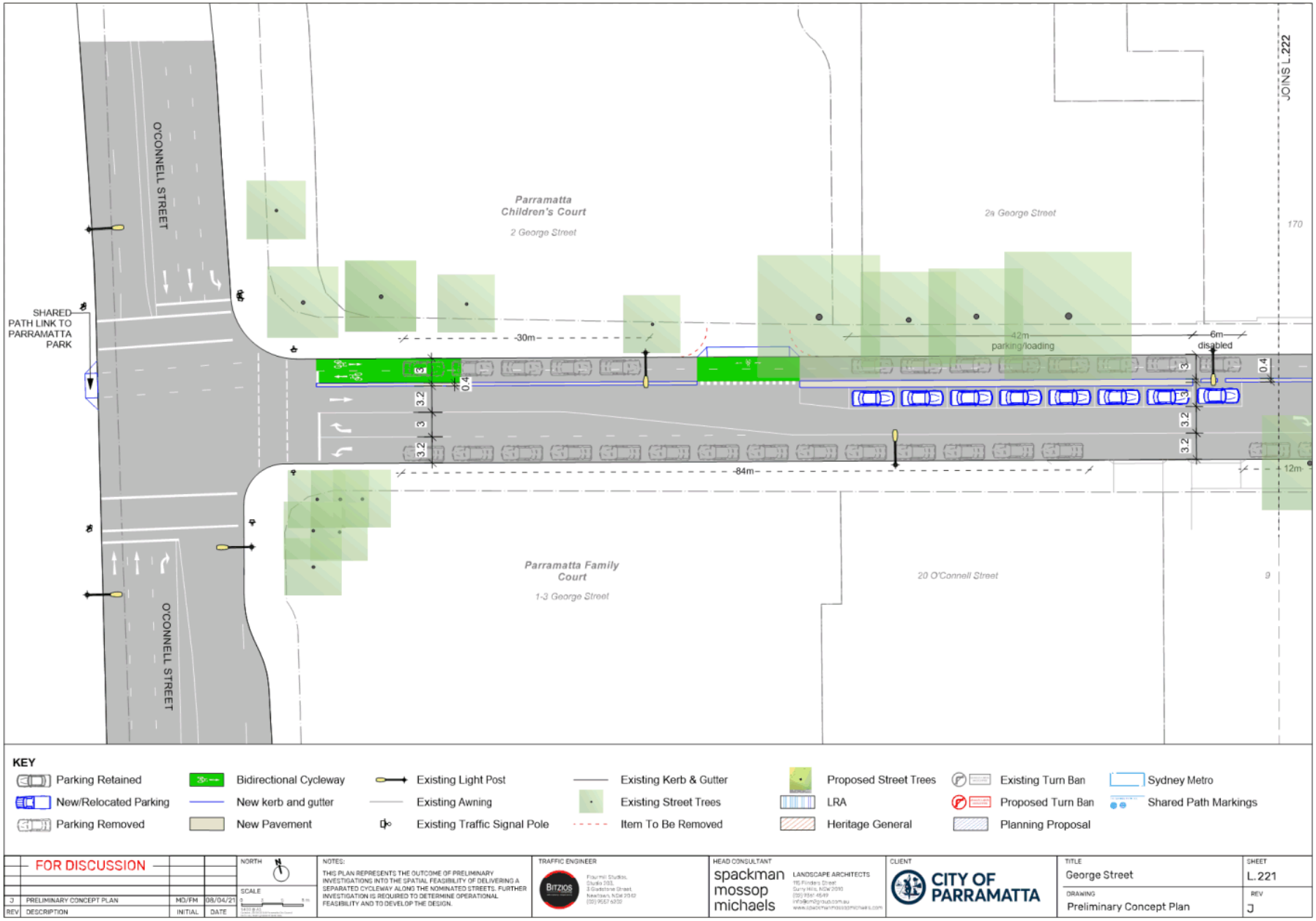
TRAFFIC ENGINEER
Bitzios

HEAD CONSULTANT
spackman mossop michaels
LANDSCAPE ARCHITECTS

CLIENT
CITY OF PARRAMATTA

TITLE: George Street
SHEET: L.000
DRAWING: Preliminary Concept Plan
REV: J


O'CONNELL STREET
SHARED PATH LINK TO PARRAMATTA PARK
Parramatta Children's Court
2 George Street
2a George Street
JOINS L.222
170
-30m-
42m parking/loading
6m disabled
0.4
3.2
3
3.2
-84m-
12m
Parramatta Family Court
1-3 George Street
20 O'Connell Street
9
KEY
Parking Retained
New/Relocated Parking
Parking Removed
Bidirectional Cycleway
New kerb and gutter
New Pavement
Existing Light Post
Existing Awning
Existing Traffic Signal Pole
Existing Kerb & Gutter
Existing Street Trees
Item To Be Removed
Proposed Street Trees
LRA
Heritage General
Existing Turn Ban
Proposed Turn Ban
Planning Proposal
Sydney Metro
Shared Path Markings
FOR DISCUSSION
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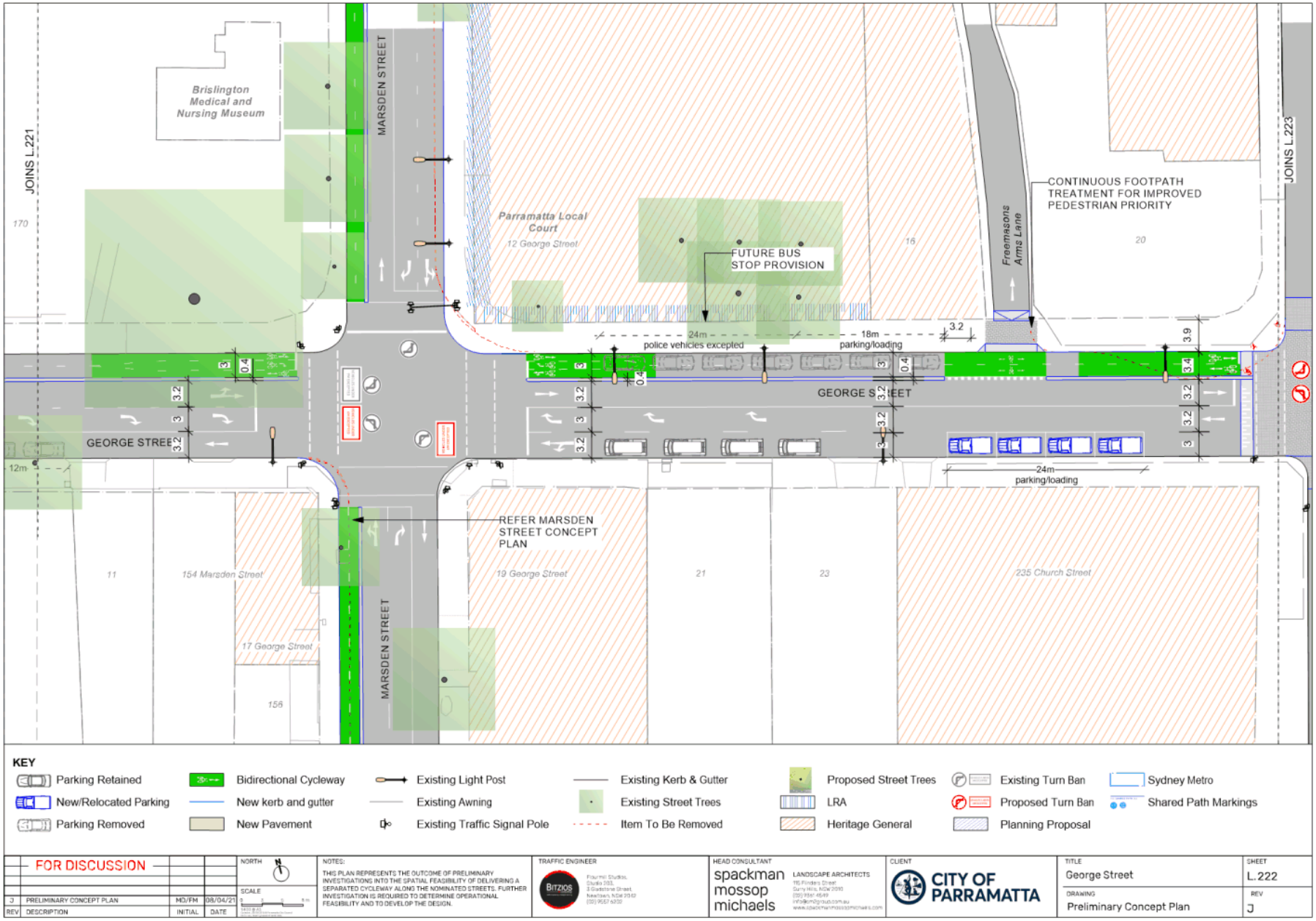
Bitzios
HEAD CONSULTANT
spackman mossop michaels
LANDSCAPE ARCHITECTS
CLIENT
CITY OF PARRAMATTA
TITLE
George Street
SHEET
L.221
DRAWING
Preliminary Concept Plan
REV
J


JOINS L.221
Brislington Medical and Nursing Museum
MARSDEN STREET
Parramatta Local Court
12 George Street
FUTURE BUS STOP PROVISION
Freemasons Arms Lane
CONTINUOUS FOOTPATH TREATMENT FOR IMPROVED PEDESTRIAN PRIORITY
JOINS L.223
24m police vehicles excepted
18m parking/loading
GEORGE STREET
24m parking/loading
REFER MARSDEN STREET CONCEPT PLAN
154 Marsden Street
19 George Street
235 Church Street
17 George Street
MARSDEN STREET
KEY
Parking Retained
New/Relocated Parking
Parking Removed
Bidirectional Cycleway
New kerb and gutter
New Pavement
Existing Light Post
Existing Awning
Existing Traffic Signal Pole
Existing Kerb & Gutter
Existing Street Trees
Item To Be Removed
Proposed Street Trees
LRA
Heritage General
Existing Turn Ban
Proposed Turn Ban
Planning Proposal
Sydney Metro
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TRAFFIC ENGINEER
Bitzios
HEAD CONSULTANT
spackman mossop michaels
LANDSCAPE ARCHITECTS
CLIENT
CITY OF PARRAMATTA
TITLE
George Street
SHEET
L.222
DRAWING
Preliminary Concept Plan
REV
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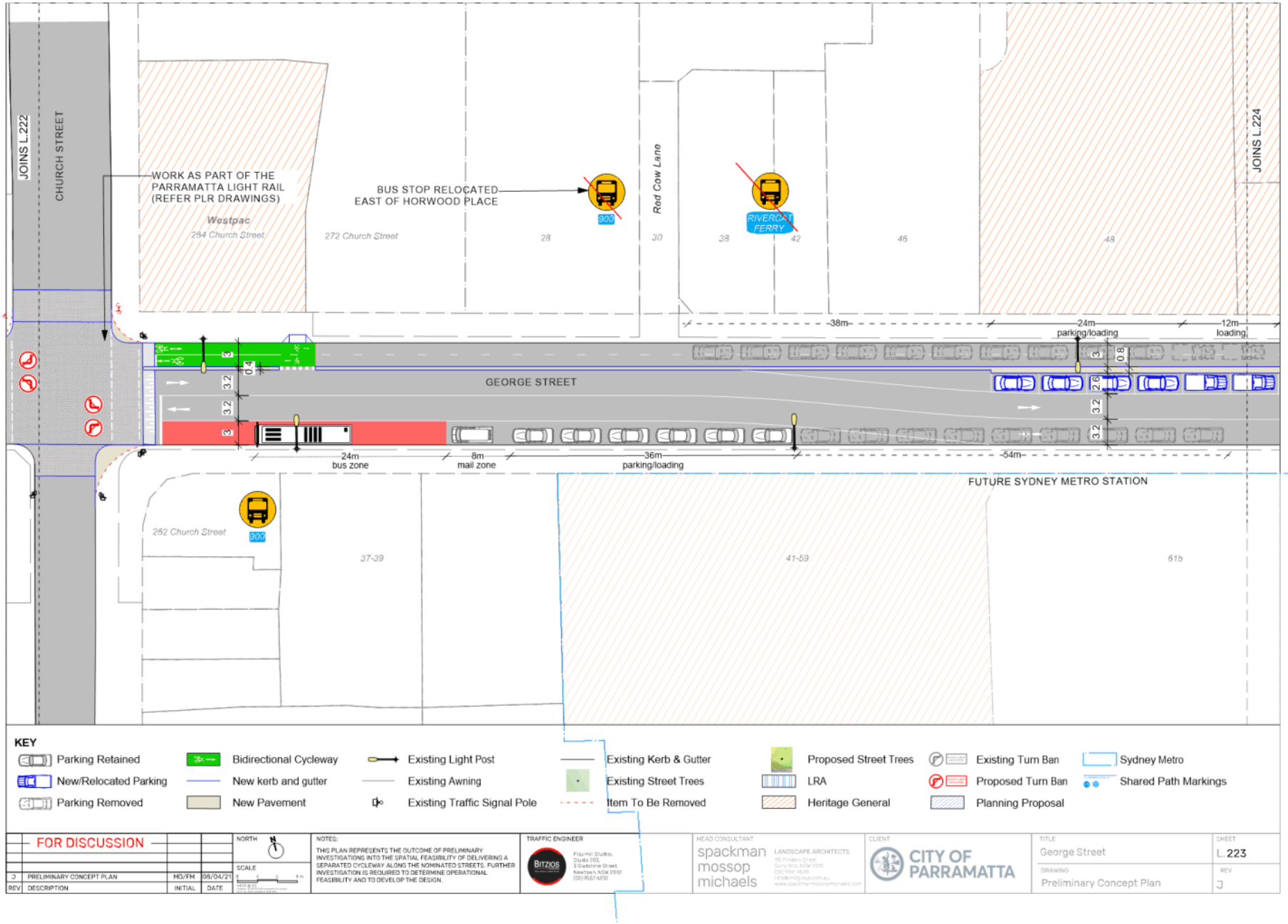
JOINS L.222
CHURCH STREET
WORK AS PART OF THE PARRAMATTA LIGHT RAIL (REFER PLR DRAWINGS)
BUS STOP RELOCATED EAST OF HORWOOD PLACE
Red Cow Lane
RIVERCAT FERRY
JOINS L.224
Westpac
264 Church Street
272 Church Street
28
30
38
42
46
48
GEORGE STREET
38m
24m parking/loading
12m loading
24m bus zone
8m mail zone
36m parking/loading
54m
FUTURE SYDNEY METRO STATION
262 Church Street
37-39
41-59
61b
KEY
Parking Retained
New/Relocated Parking
Parking Removed
Bidirectional Cycleway
New kerb and gutter
New Pavement
Existing Light Post
Existing Awning
Existing Traffic Signal Pole
Existing Kerb & Gutter
Existing Street Trees
Item To Be Removed
Proposed Street Trees
LRA
Heritage General
Existing Turn Ban
Proposed Turn Ban
Planning Proposal
Sydney Metro
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Bitzios
HEAD CONSULTANT
spackman mossop michaels
LANDSCAPE ARCHITECTS
CLIENT
CITY OF PARRAMATTA
TITLE
George Street
SHEET
L.223
DRAWING
Preliminary Concept Plan
REV
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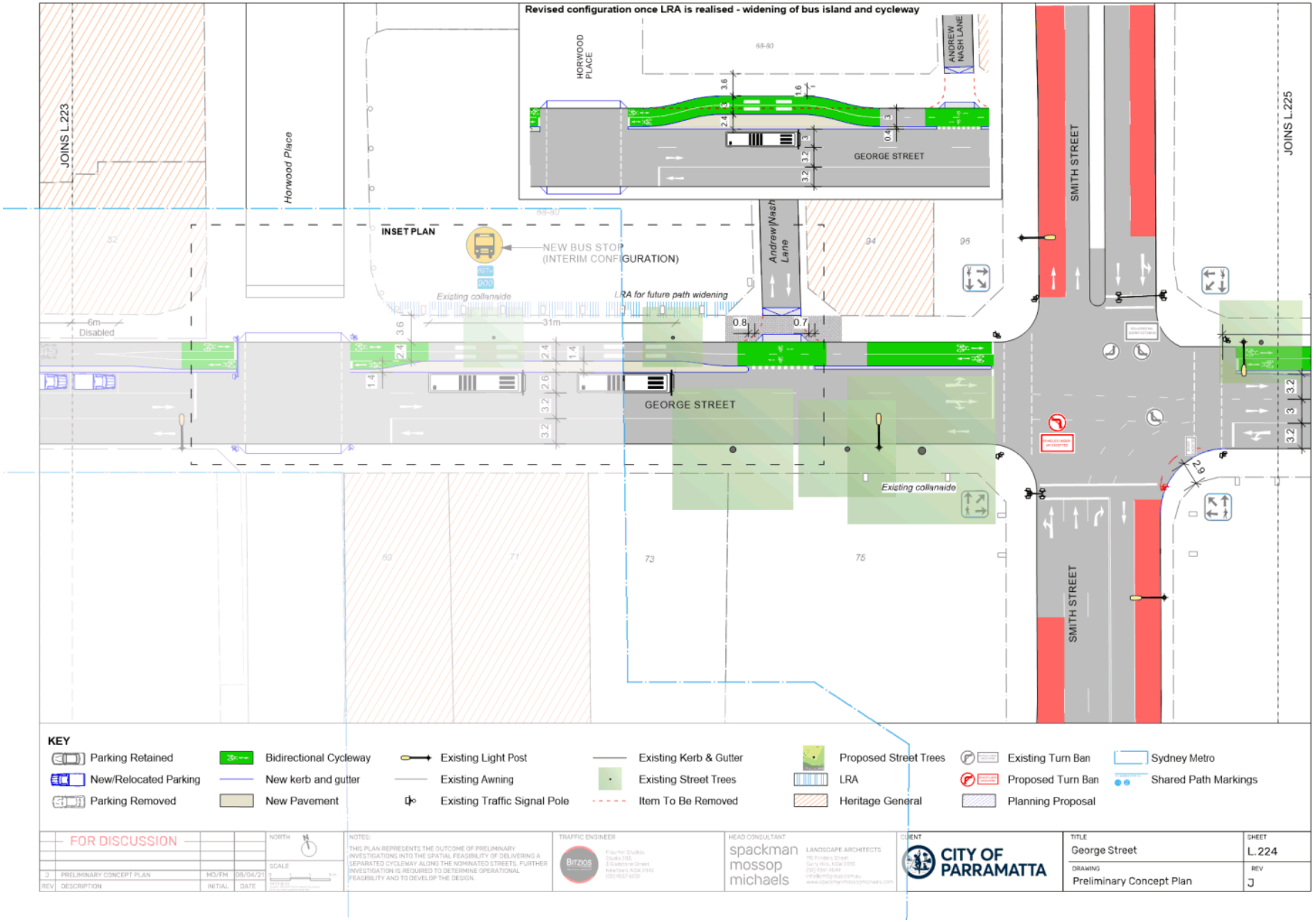
Revised configuration once LRA is realised - widening of bus island and cycleway
HORWOOD PLACE
ANDREW NASH LANE
GEORGE STREET
JOINS L.223
Horwood Place
INSET PLAN
NEW BUS STOP (INTERIM CONFIGURATION)
Existing collanaide
LRA for future path widening
Andrew Nash Lane
SMITH STREET
JOINS L.225
6m Disabled
31m
0.8
0.7
GEORGE STREET
Existing collanaide
SMITH STREET
KEY
Parking Retained
New/Relocated Parking
Parking Removed
Bidirectional Cycleway
New kerb and gutter
New Pavement
Existing Light Post
Existing Awning
Existing Traffic Signal Pole
Existing Kerb & Gutter
Existing Street Trees
Item To Be Removed
Proposed Street Trees
LRA
Heritage General
Existing Turn Ban
Proposed Turn Ban
Planning Proposal
Sydney Metro
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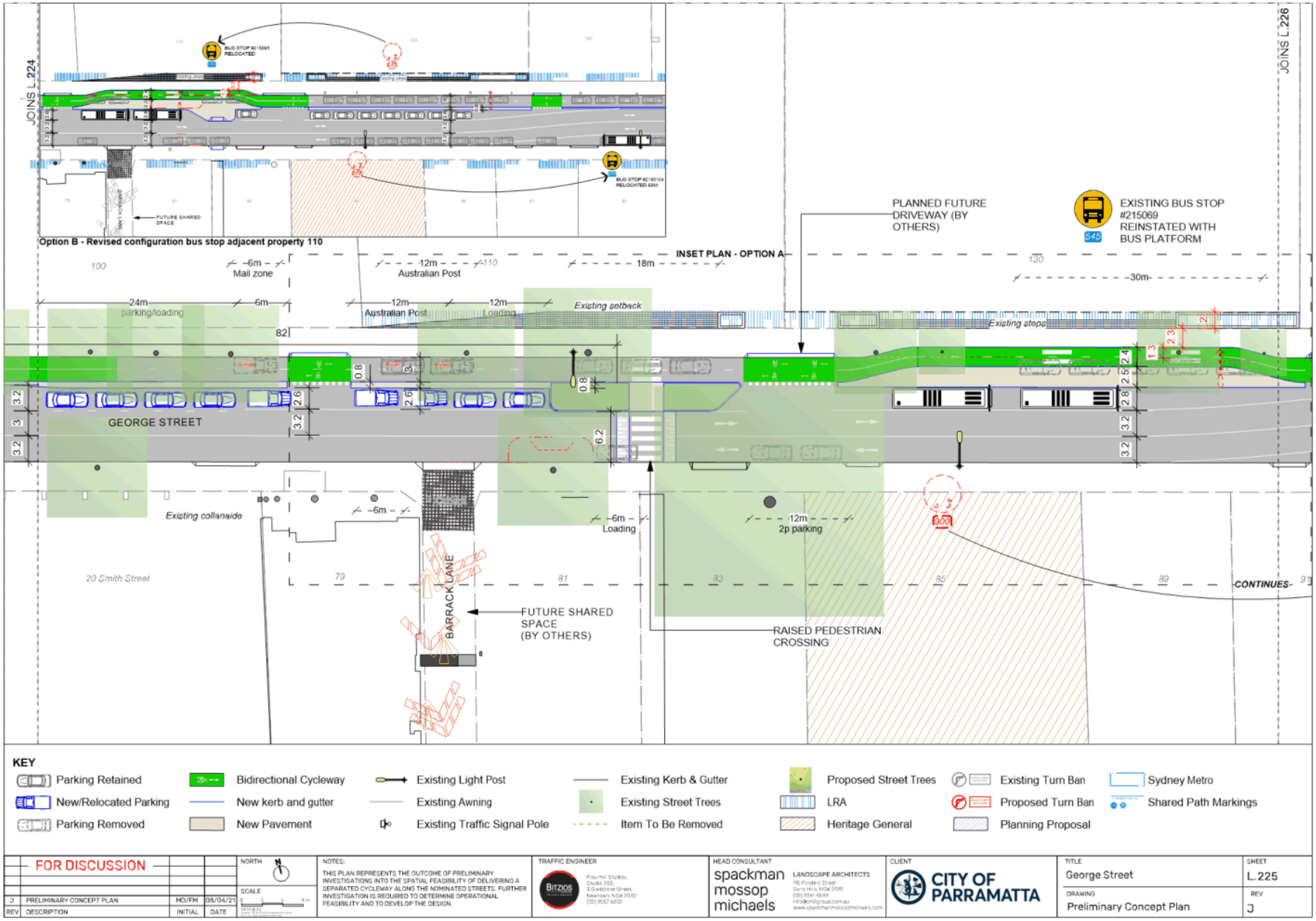
TRAFFIC ENGINEER
Bitzios
HEAD CONSULTANT
spackman mossop michaels
LANDSCAPE ARCHITECTS
CLIENT
CITY OF PARRAMATTA
TITLE
George Street
SHEET
L.224
DRAWING
Preliminary Concept Plan
REV
J


JOINS L.224
JOINS L.226
Option B - Revised configuration bus stop adjacent property 110
INSET PLAN - OPTION A
PLANNED FUTURE DRIVEWAY (BY OTHERS)
EXISTING BUS STOP #215069 REINSTATED WITH BUS PLATFORM
6m Mail zone
12m Australian Post
18m
30m
24m parking/loading
6m
12m Australian Post
12m Loading
Existing setback
Existing steps
GEORGE STREET
Existing collanaide
6m Loading
12m 2p parking
20 Smith Street
BARRACK LANE
FUTURE SHARED SPACE (BY OTHERS)
RAISED PEDESTRIAN CROSSING
CONTINUES
KEY
Parking Retained
New/Relocated Parking
Parking Removed
Bidirectional Cycleway
New kerb and gutter
New Pavement
Existing Light Post
Existing Awning
Existing Traffic Signal Pole
Existing Kerb & Gutter
Existing Street Trees
Item To Be Removed
Proposed Street Trees
LRA
Heritage General
Existing Turn Ban
Proposed Turn Ban
Planning Proposal
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HEAD CONSULTANT
spackman mossop michaels
LANDSCAPE ARCHITECTS
CLIENT
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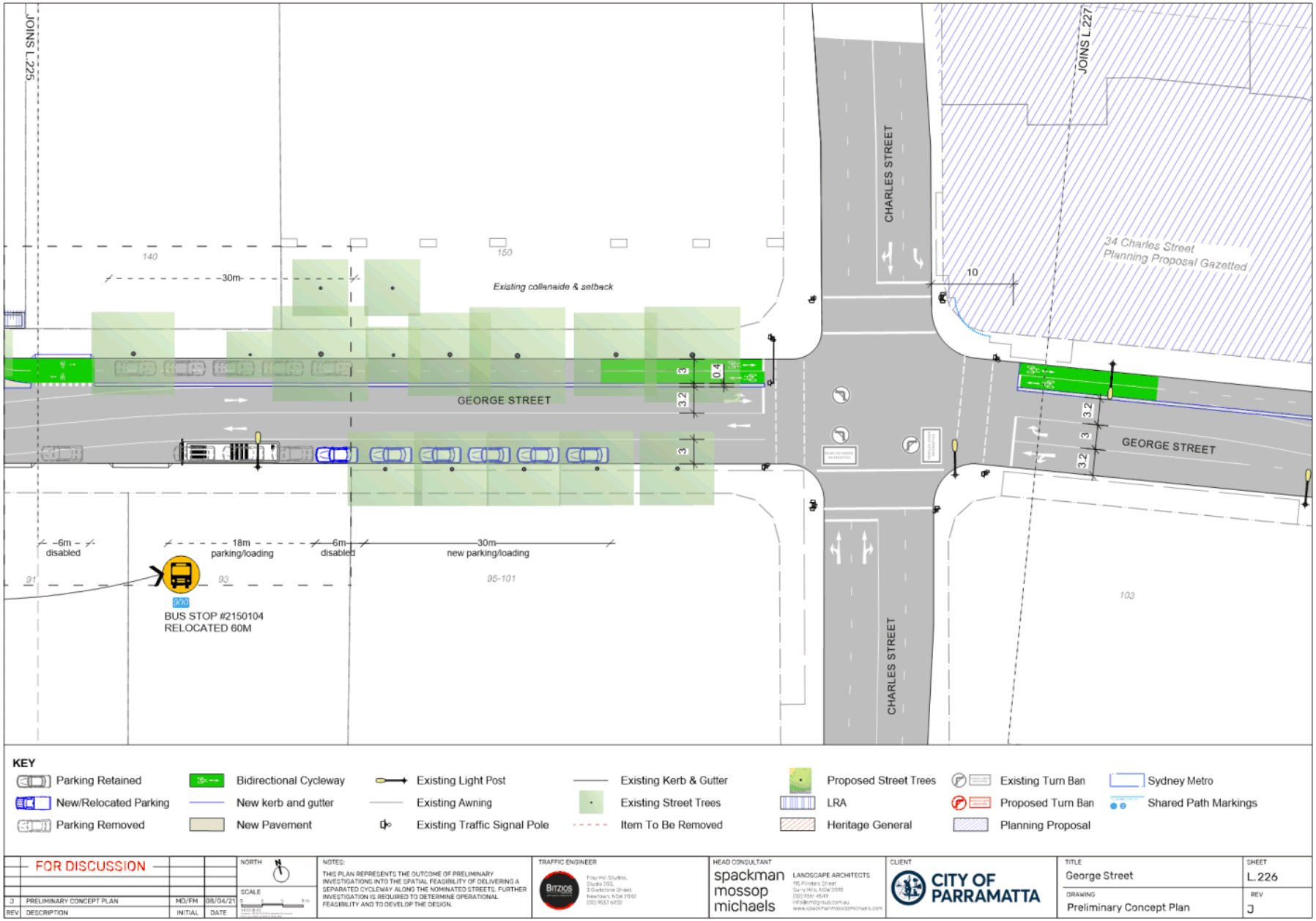
JOINS L.225
JOINS L.227
CHARLES STREET
34 Charles Street
Planning Proposal Gazetted
140
150
30m
Existing collanaide & setback
10
GEORGE STREET
3
0.4
3.2
3
GEORGE STREET
3.2
3
3.2
6m
disabled
18m
parking/loading
6m
disabled
30m
new parking/loading
91
93
95-101
103
BUS STOP #2150104
RELOCATED 60M
CHARLES STREET
KEY
Parking Retained
New/Relocated Parking
Parking Removed
Bidirectional Cycleway
New kerb and gutter
New Pavement
Existing Light Post
Existing Awning
Existing Traffic Signal Pole
Existing Kerb & Gutter
Existing Street Trees
Item To Be Removed
Proposed Street Trees
LRA
Heritage General
Existing Turn Ban
Proposed Turn Ban
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George Street
SHEET
L.226
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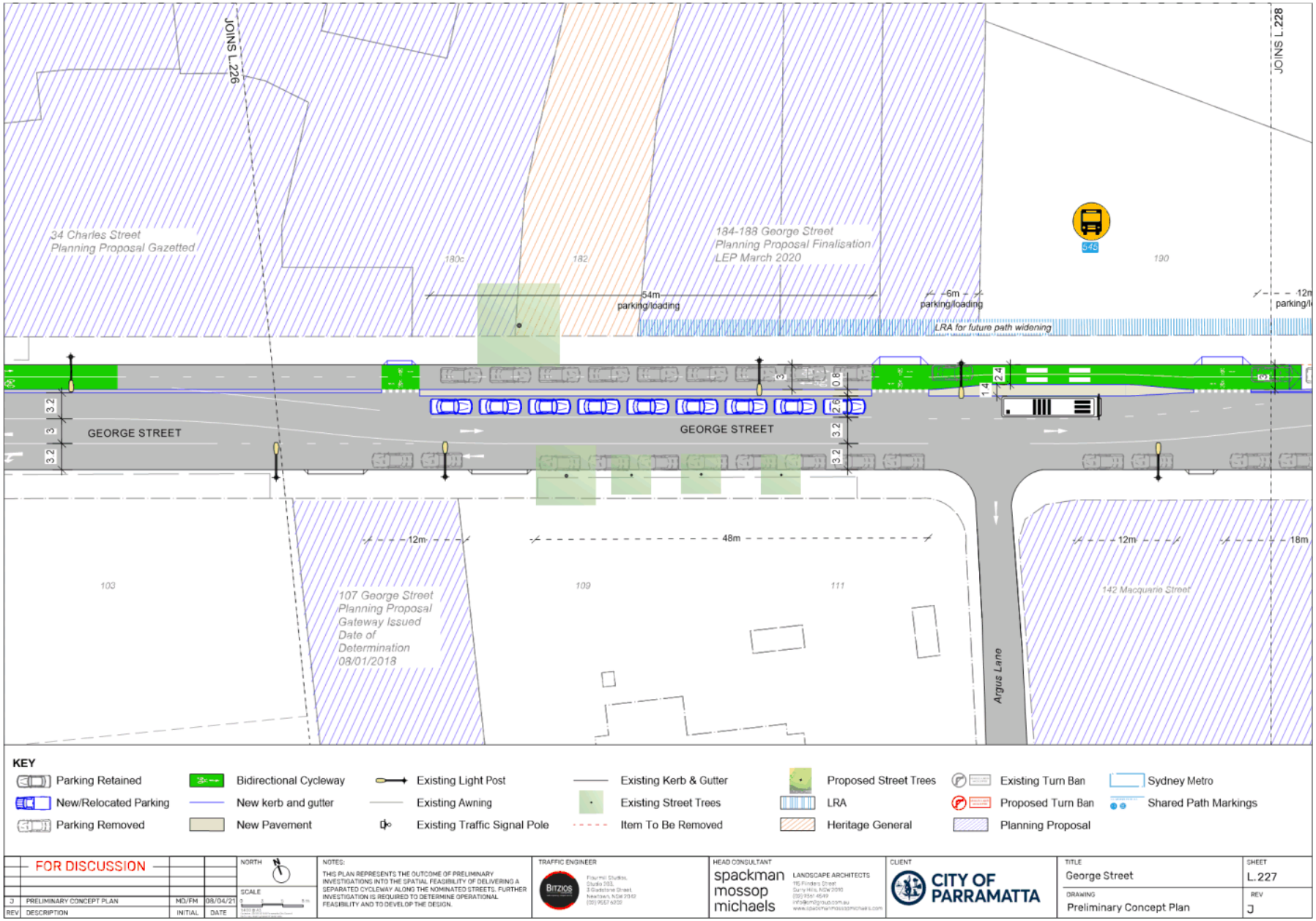
JOINS L.226
JOINS L.228
34 Charles Street
Planning Proposal Gazetted
184-188 George Street
Planning Proposal Finalisation
LEP March 2020
180c
182
190
54m
parking/loading
6m
parking/loading
12m
parking/l
LRA for future path widening
GEORGE STREET
GEORGE STREET
3.2
3
3.2
3
0.8
2.6
3.2
3.2
2.4
1.4
3
12m
48m
12m
18m
103
107 George Street
Planning Proposal
Gateway Issued
Date of
Determination
08/01/2018
109
111
142 Macquarie Street
Argus Lane
KEY
Parking Retained
New/Relocated Parking
Parking Removed
Bidirectional Cycleway
New kerb and gutter
New Pavement
Existing Light Post
Existing Awning
Existing Traffic Signal Pole
Existing Kerb & Gutter
Existing Street Trees
Item To Be Removed
Proposed Street Trees
LRA
Heritage General
Existing Turn Ban
Proposed Turn Ban
Planning Proposal
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DRAWING
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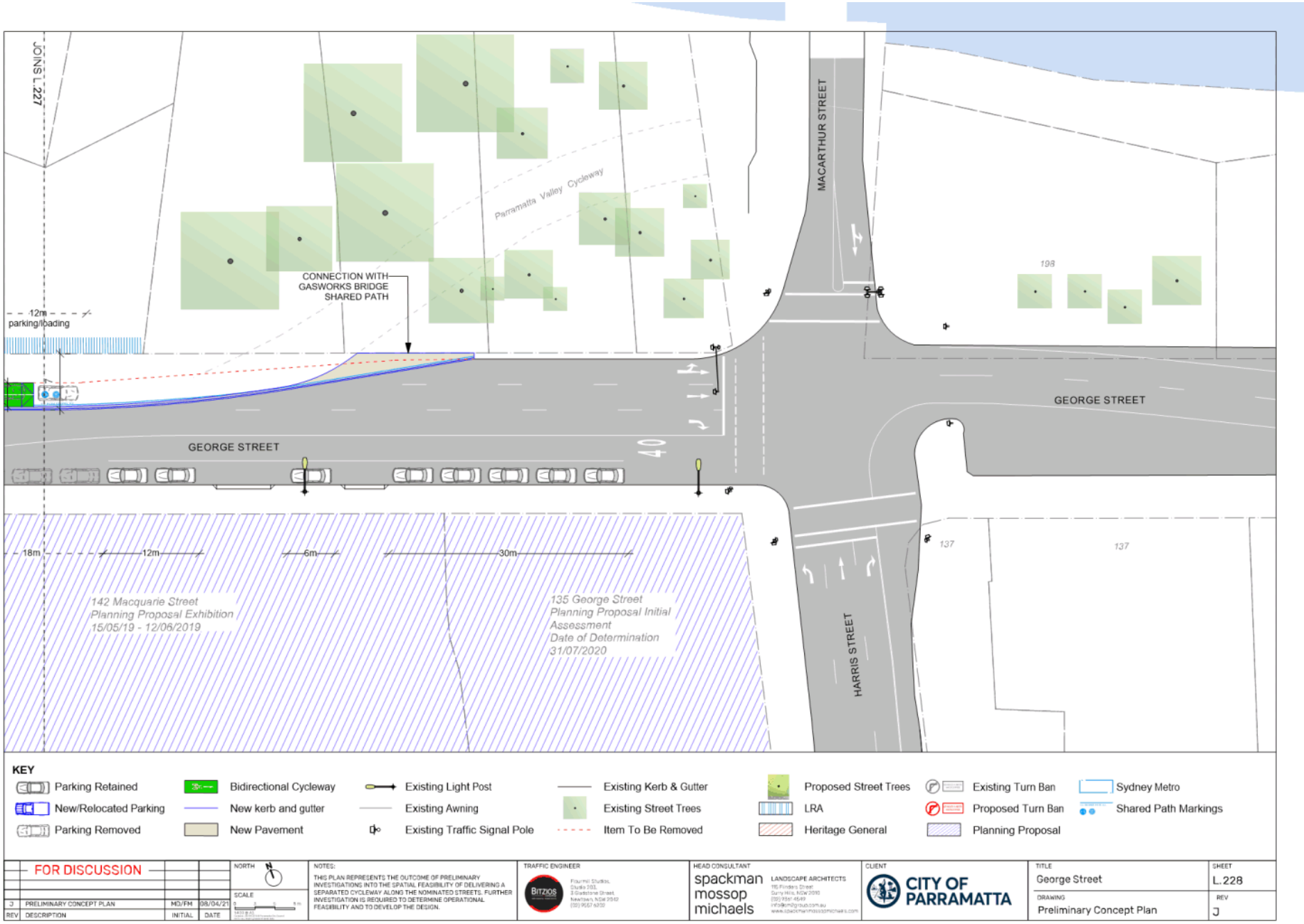
JOINS L227
Parramatta Valley Cycleway
MACARTHUR STREET
CONNECTION WITH GASWORKS BRIDGE SHARED PATH
12m parking/loading
GEORGE STREET
GEORGE STREET
40
198
137
137
18m
12m
6m
30m
142 Macquarie Street
Planning Proposal Exhibition
15/05/19 - 12/06/2019
135 George Street
Planning Proposal Initial Assessment
Date of Determination
31/07/2020
HARRIS STREET
KEY
Parking Retained
New/Relocated Parking
Parking Removed
Bidirectional Cycleway
New kerb and gutter
New Pavement
Existing Light Post
Existing Awning
Existing Traffic Signal Pole
Existing Kerb & Gutter
Existing Street Trees
Item To Be Removed
Proposed Street Trees
LRA
Heritage General
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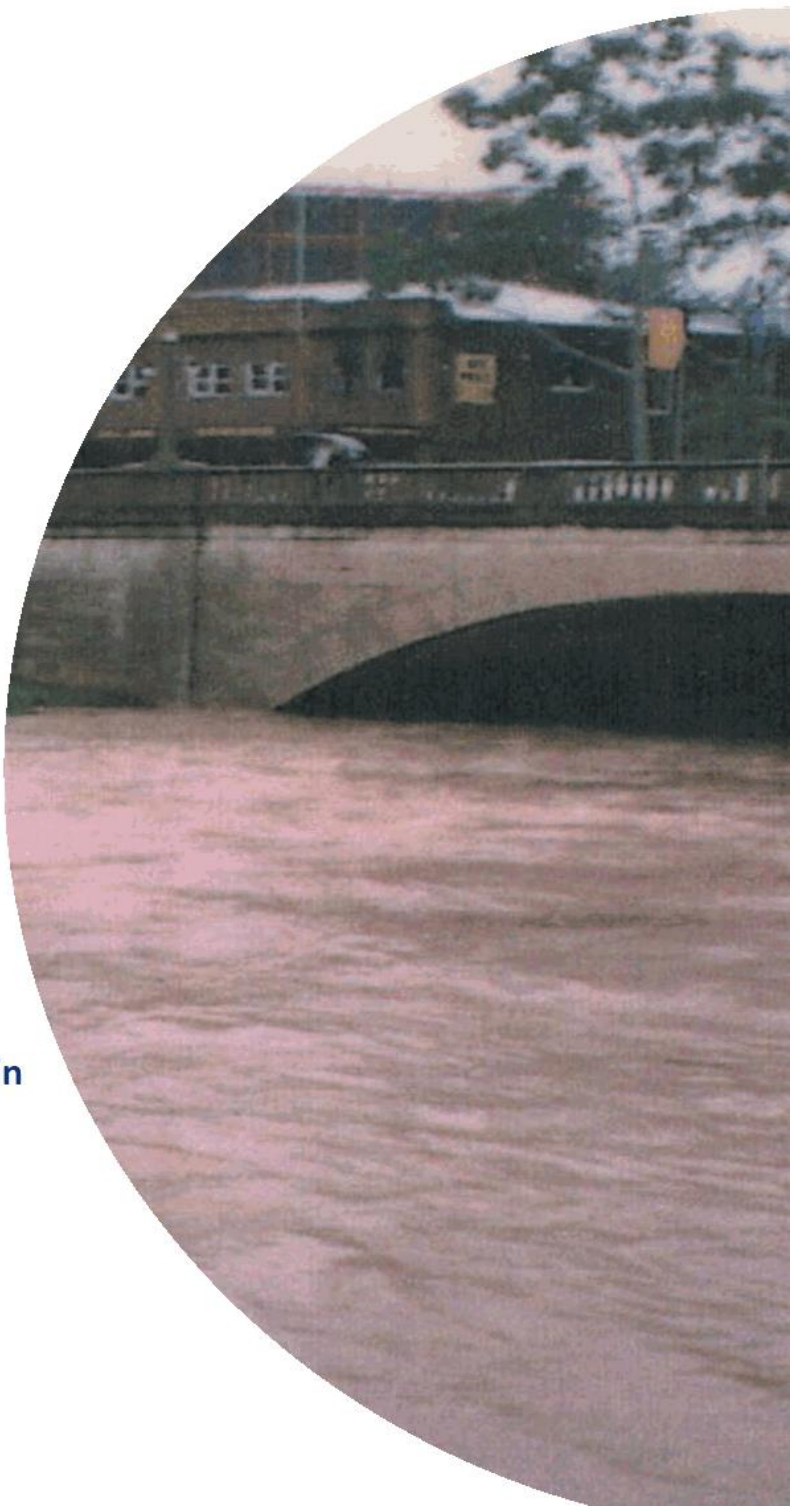
HEAD CONSULTANT
spackman mossop michaels
LANDSCAPE ARCHITECTS
CLIENT
CITY OF PARRAMATTA
TITLE
George Street
SHEET
L.228
DRAWING
Preliminary Concept Plan
REV
J

Appendix 5 – Update of Parramatta Floodplain Risk Management Plans (Molino Stewart, 2021)

MOLINO STEWART

ENVIRONMENT & NATURAL HAZARDS



Update of Parramatta Floodplain Risk Management Plans

Final

MOLINO STEWART
ENVIRONMENT & NATURAL HAZARDS

Update of Parramatta Floodplain Risk Management Plans

FINAL

for

City of Parramatta Council

by

Molino Stewart Pty Ltd
ACN 067 774 332

OCTOBER 2021

MOLINO STEWART PTY LTD ABN 95 571 253 092 ACN 067 774 332
PO BOX 614, PARRAMATTA CBD BC, PARRAMATTA NSW 2124 TEL: (02) 9354 0300
www.molinostewart.com.au

DOCUMENT CONTROL

Document Reference	0715 Updated Parramatta FRMP final
Project	Update of Parramatta Floodplain Risk Management Plans
Document Type	Final
Author	Tim Morrison

REVISION HISTORY

Date	Version	Name	Comments
29/09/2015	1	Tim Morrison	Draft report for internal review
12/10/2015	2	Steven Molino	Draft report for client review
20/11/2015	3	Steven Molino	Second draft for client review in response to client feedback
25/02/2016	4	Steven Molino	*New Section amalgamating similar flood risk categories*
26/02/2016	5	Steven Molino	Incorporating client comments
27/08/2019	6	Jenni Kremer/ Steven Molino	Updates to reflect changes external to the report since 2016
23/09/2019	7	Steven Molino	Incorporating client comments
13/10/2021	8	Steven Molino	Final consistent with Council decision on 11 October 2021

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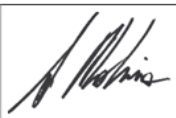
For Molino Stewart	
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EXECUTIVE SUMMARY

Parramatta is located geographically and demographically in the centre of Sydney and is often referred to, both officially and unofficially, as Sydney's second central business district (CBD). The NSW Government and City of Parramatta Council have identified Parramatta CBD as a key growth centre for commercial and residential development.

One of the constraints for development within the Parramatta CBD is that a significant proportion of the area is within the floodplain of the Parramatta River and its tributaries.

As part of its vision for growing the Parramatta CBD, the City of Parramatta Council has prepared the Parramatta CBD Planning Strategy, which is a road map to expanding the CBD through amending a number of planning controls, such as floor space ratios and also expanding the CBD boundaries. As part of the Parramatta CBD Planning Strategy, Council is required to submit a Planning Proposal to the Department of Planning, Industry and Environment to make alterations to the current Parramatta Local Environment Plan (LEP) 2011.

The *Environmental Planning and Assessment Act* 1979 sets out a number of requirements that must be met for planning proposals to be approved. One is Section 9.1 Direction 4.3 which deals with development on floodplains. A requirement of the direction is that a planning proposal must not permit a significant increase in development in that area unless it has been prepared in accordance with the NSW Floodplain Development Manual (2005).

Accordingly, Council has engaged Molino Stewart to review the two Floodplain Risk Management Plans that cover the Parramatta CBD area and prepare an updated Floodplain Risk Management Plan. The review and preparation involved the following steps:

- The existing plans were reviewed to determine which measures in those plans were still to be implemented
- Council officers were interviewed and field inspections of the CBD undertaken to identify practical challenges and risks to life and property which have arisen from existing development in the CBD floodplains
- The draft planning proposal was reviewed to identify opportunities which it provides to address existing flood problems and what new risks it presents
- A comprehensive flood risk assessment was completed with particular emphasis on risk to life to determine whether development intensification in the CBD is appropriate and whether it needs to be controlled to manage flood risk
- A detailed evacuation analysis was undertaken to assess the feasibility of various evacuation options and evacuation infrastructure upgrades
- Flood risk management measures were identified in consultation with the Parramatta Floodplain Management Committee
- A draft Parramatta CBD Floodplain Risk Management Plan was prepared.

This report concludes that the intensification of development in the Parramatta CBD represents a tolerable risk to life and property providing that amendments are made to the Parramatta LEP 2011 and Parramatta Development Control Plan (DCP) 2011 to better manage some of the risks of flooding to life. The review has also identified opportunities for DCP amendments to be made which could result in less development restrictions in parts of the floodplain and improved building design outcomes.

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The draft plan proposes:

- An application to the Minister for Planning and Open Spaces for exceptional circumstances to impose controls above the Flood Planning Level for development within the Parramatta CBD affected by the Probable Maximum Flood (PMF)
- The development of four (4) risk to life categories for determining the different types of mitigation and response measures required
- The provision of shelter above the PMF level and a building access at or above the 1% AEP flood level within the LEP rather than just in the DCP to ensure that these minimum life safety measures are applied to all developments
- A total of 14 amendments to Parramatta DCP 2011
- A review of policy in relation to fencing and screening within floodways
- Better communication of the detailed flood information available through Section 10.7 certificates
- Encouraging NSW State Emergency Service to complete the update of the Parramatta Local Flood Sub Plan
- Investigation of Section 7.11 contributions to fund flood mitigation projects
- Improved communication and public education regarding flood risk, preparedness, response and recover
- Further development of the flood early warning system for the Parramatta River
- Encouraging Sydney Water to review its channel maintenance programs
- The preparation of a Flood Emergency Response Plan including plans for evacuation for the CBD

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1 INTRODUCTION

1.1 BACKGROUND

Parramatta CBD is currently undergoing significant growth and redevelopment. One of the potentially limiting factors to this growth is the availability of floor space for commercial and residential use. Currently Parramatta CBD has a shortage of prime commercial office space, with vacancy rates far lower than other major centres in Sydney and the Australian average.

The importance of a successful and growing Parramatta CBD is recognised by the NSW State Government, labelling Parramatta as a "CBD of metropolitan significance" (NSW Department of Planning and Environment, 2014). As such, the government considers the growth of Parramatta CBD to be crucial to the growth of Sydney as a whole. It subsequently released the Greater Sydney Region Plan (Greater Sydney Commission, 2018a) and the Central City District Plan (Greater Sydney Commission, 2018b) which further reinforced Parramatta's strategic role for the entire metropolitan region and the importance of future growth in Parramatta.

In response, City of Parramatta Council developed the Parramatta CBD Planning Strategy (the CBD Strategy), which was adopted on 27th April 2015. Key features of the strategy are:

- Expand the boundaries of the Parramatta CBD
- Increase the floor space ratio controls in certain areas
- Alter solar access controls
- Alter building height restrictions
- Expand the commercial core of the CBD

An implementation strategy for the CBD Strategy has been developed, which includes the development of a planning proposal to modify the Parramatta LEP 2011. In order for the planning proposal to be approved, a number of statutory obligations need to be met. This includes the Section 9.1 Direction 4.3 – Flood Prone Land of the *Environmental Planning and Assessment Act 1979* (the direction). Clause 3 of the direction "When this direction applies" states:

"This direction applies when a relevant planning authority prepares a planning proposal that creates, removes or alters a zone or a provision that affects flood prone land"

The direction goes on to state what the planning authority must do when the direction applies. These requirements are generally in line with the NSW Flood Prone Land Policy and the Floodplain Development Manual (DIPNR, 2005).

One of these requirements is that a planning proposal should not permit a significant increase in development within flood prone land. The direction allows inconsistency with the requirements if the planning proposal is incorporated into a Floodplain Risk Management Plan that has been created in accordance with the principles and guidelines of the Floodplain Development Manual (2005).

Significant areas within Parramatta CBD are flood prone. Floodplain risk management of these flood prone areas is generally undertaken under two existing floodplain risk management plans (the original plans), these are:

- The Floodplain Risk Management Plan for the Upper Parramatta River Catchment, Bewsher Consulting for the Upper Parramatta River Catchment Trust (April 2003)
- The Lower Parramatta Floodplain Risk Management Plan, SKM for City of Parramatta Council (August 2005).

In order to meet the requirements of the direction, Parramatta Council is updating the two original plans in light of the changes that have been made to both the land use and regulatory and planning frameworks as well as the future land use changes proposed by the CBD Strategy.

1.2 OBJECTIVES

The primary objectives of this project are to:

- Update the two original plans in light of the land use and regulatory changes that have occurred since the plans were adopted as well as incorporate the implementation of the plans that has occurred to date.
- Ensure that the planning proposal as part of the CBD Strategy is consistent with Section 9.1 Direction 4.3 of the *Environmental Planning and Assessment Act 1979*.

1.3 STUDY AREA

The study area covered by this project is the planning proposal extent. This area is a subset of the area of the two existing plans, which cover a much larger part of the Parramatta LGA. Some elements of the existing plan review cover areas outside of the planning proposal extent, however, these are not the focus of the study.

Figure 1 shows the extent of the planning proposal area. It also shows the lots that have been identified through preliminary analysis that are likely to be subject to redevelopment as a result of the planning proposal.

The planning proposal area is the subject of the risk assessment that has been undertaken to determine whether the planning proposal meets the requirements of the direction.

1.4 SCOPE OF THE UPDATE

The Floodplain Development Manual (2005) recommends a floodplain management process which involves data collection followed by a flood study then a floodplain risk management study followed by a floodplain risk management plan. This process should be revisited periodically using updated information.

This report is an update of the two existing floodplain risk management plans without new data collection or an update to the flood study or floodplain risk management study.

It relies mostly on data, such as model results, that have been gathered as part of the development of the original plans. The focus of this project is to update the floodplain risk management plan utilising the existing flood data and to apply it in light of:

- Changes to the regulatory framework since the original plans were developed
- Land use changes that have occurred since the original plans were developed and changes that will occur in the future through the planning proposal.
- Changes to the planning environment that has occurred since the development of the Original Plans.

At the time of writing, Council was in the process of finalising a new flood study to cover the Upper and Lower Parramatta River floodplains within the LGA.

It is understood that this new Flood Study will produce significantly more detailed and accurate data for the assessment of flood risks within the LGA. However, it is currently anticipated to be completed in 2020, with an updated floodplain risk management study and plan likely to be completed following that. Therefore this plan update was required to bring the original Plans in line with the new regulatory framework, land use and planning instruments in the interim. It is recommended that this study is reviewed once the new data from this Flood Study has been received.

A draft of this report was forwarded to the then Department of Planning and Environment in support of a request for a Gateway determination on the Draft Parramatta CBD Planning Proposal 2017. That draft of this report recommended that the (then) City of Parramatta Council request that "exceptional circumstances" be granted for the CBD under Section 9.1 Direction 4.3 Flood Prone Land. The Department requested that further investigations be carried out in relation to flood evacuation options to support that request. That report was submitted (Molino Stewart, 2017).

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Figure 1: Planning Proposal Extent and potential redevelopment lots

In December 2018, the Department issued a conditional Gateway determination to allow the planning proposal to be updated and consolidated. This included several conditions to seek further clarification or evidence to support the planning proposal.

One of those conditions was that Council:

"update the planning proposal and maps to provide a consolidated explanation of provisions and assessment of the intended outcomes as amended by this Gateway determination, and review the studies that have been prepared to support the planning proposal and update if required."

It also granted exceptional circumstances to enable further agency consultation on the planning controls that will apply to land impacted by the PMF.

To comply with the condition above, the Flood Evacuation Report was updated to incorporate new information which had become available since it was first prepared and this report has been updated to take into account the findings of the Flood Evacuation Report and to incorporate other changes which have occurred since this report was first drafted.

1.5 REPORT FORMAT

This report has been structured in the following way:

- Chapter 2 places the project in the context of the various planning documents and instruments
- Chapter 3 is a review of the existing plan measures, and focuses on whether they have been implemented and which, if any, of those measures need to be carried through or amended in the updated plan
- Chapter 4 describes the planning proposal and outlines its practical implications with regard to flooding
- Chapter 5 is a flood risk assessment which describes the flood risk assessment procedure undertaken on the planning proposal
- Chapter 6 presents the potential Management options arising from the flood risk assessment
- Chapter 7 is the conclusions and recommendations
- Chapter 8 is the recommended Updated Floodplain Risk Management Plan
- Chapter 9 is a list of reference documents used in the project.

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2 PLANNING CONTEXT

This chapter sets out the relevant planning documents that have been taken into account when undertaking this project.

2.1 EXISTING FLOODPLAIN MANAGEMENT PLANS

Improvements to floodplain risk management within the study area are currently undertaken according to the two original floodplain risk management plans.

These plans provide a clear set of suggested measures to be undertaken by Council and other authorities in order to reduce the flood risk in the study area. These measures generally fall under three categories:

- Flood Modification Measures: These modify the behaviour of the flood itself by reducing flood levels or velocities
- Property Modification Measures: These modify either the existing buildings (voluntary house purchase/raising) or future development (through development controls) within the floodplain
- Response Modification Measures: These actions modify the response of the population to the flood threat, generally through community education or improvements to emergency management.

Further investigation of potential options may also be measures within a plan.

The original plans have a number of proposed actions that fall into each of these categories. However, since the development of the original plans, a number of these measures have been made redundant, particularly where:

- The regulatory framework has changed such that the suggested measure would no longer be viable (e.g. repeal of REP 28 - Parramatta)
- Further investigations have shown that the suggested measure is not effective or feasible

2.2 STRATEGIC PLANS

The NSW State Government and City of Parramatta have prepared a number of strategies and plans that outline the future growth of Parramatta. These include:

- Greater Sydney Region Plan A Metropolis of Three Cities – connecting people (Greater Sydney Commission 2018a) outlines vision for the Greater Sydney Region, focuses on three cities (Western Parkland, Central River and Eastern Harbour) within the Greater Sydney Region and is based on the expectation that the population will be 8 million residents in 2058. The population in the 'Central River City' is expected to increase from 1.3 million to 1.7 million by 2038.
- Our Greater Sydney 2056 Central City District Plan – connecting communities (GSC 2018b) is a 20 year plan working towards the 40 year vision outlined in the Greater Sydney Region Plan. Parramatta is at the Centre of the Central City District. As part of this strategy an increase of 55,000 to 70,000 jobs throughout Greater Parramatta is planned, to be supported by new development,
- The Economic Development Plan 2017-2021 (City of Parramatta Council 2017) aims to increase the number of jobs in the Parramatta LGA by 20,000 by 2021, 9,500 of which are expected to be in the CBD. This will be supported by the investment and development currently taking place in the CBD, as well as a range of strategies from council.
- The Community Strategic Plan 2018-2038 (City of Parramatta Council, 2018) puts strategies in place to manage the elements of growth that the City can influence, leading to an improved quality of life for all.

In the 2016 Census 137,329 people listed Parramatta as their "Place of Work" with the Economic Development Plan suggesting 47,000 of those were in the Parramatta CBD.

While a significant number of the projected new jobs will be located in various precincts with Parramatta LGA, it is likely that the majority of the growth will occur inside the CBD.

The CBD Strategy has been developed by Council over a number of years as a response to the planned jobs growth and is aimed at amending the planning controls within the CBD. The vision of the strategy is:

"Parramatta will be Australia's next great city, defined by landmark buildings and high quality public spaces with strong connections to regional transport. It will respect its heritage, be an exemplar in design excellence, facilitate job growth and ensure its streets are well activated"

In order to achieve the vision, the CBD strategy proposes to:

- Expand the boundaries of the Parramatta CBD into the neighbouring area.
- Amend planning controls to encourage re-development to create larger buildings. This is achieved through increasing the allowable floor space ratios and removing building height restrictions (where this is not constrained by other factors such as solar access).

2.3 STATE FLOOD PLANNING DOCUMENTS

2.3.1 Environmental Planning and Assessment Act 1979 Section 9.1 Directions

Section 9.1 of the EP&A Act permits the Minister for Planning to issue a direction in relation to the making of local environmental plans. Several of these have been issued including Direction 4.3 which related to flood prone land.

The objectives of the direction are to ensure that the development on flood prone land is consistent with the Flood Prone Land Policy and the Floodplain Development Manual (2005) and also to ensure that the planning proposal considers flood hazard and the flood impacts on and off the subject land.

The requirements of the direction are:

- The planning proposal must be consistent with the NSW Flood Prone Land Policy and Floodplain Development Manual (FDM)
- The planning proposal must not rezone land within the flood planning areas from Special Use, Special Purpose, Recreation, Rural or Environmental Protection Zones to a Residential, Business, Industrial, Special Use or Special Purpose Zone
- The planning proposal must not contain provisions that apply to the planning areas which:
  - permit development in floodway areas
  - permit development that will result in significant flood impacts to other properties
  - permit a significant increase in the development of that land
  - are likely to result in a substantially increased requirement for government spending on flood mitigation measures, infrastructure or services
  - permit development to be carried out without consent except for the purposes of agriculture, roads or exempt development
- The planning proposal must not impose flood related development controls above the residential flood planning level for resident development on land, unless adequately justified
- The planning proposal must not determine a flood planning level that is inconsistent with the FDM

The direction also includes an allowance for inconsistencies. A planning proposal may be inconsistent with the direction if it can satisfy the Department of Planning that:

- The planning proposal is in accordance with a floodplain risk management plan prepared in accordance with the principles and guidelines of the Floodplain Development Manual (2005)

Or

- The provisions of the planning proposal that are inconsistent are of minor significance

As discussed in previous sections of this report, the aim of the planning proposal is to

essentially permit a significant increase in development within the existing and expanded CBD. Because much of the planning area is floodplain, the planning proposal has the potential to "permit a significant increase in the development of" the floodplain. As such, the planning proposal is not consistent with the direction.

In order to satisfy the requirements of the direction, an updated floodplain risk management plan prepared in accordance with the NSW Floodplain Development Manual, is required.

2.3.2 NSW Flood Prone Land Policy

The NSW Flood Prone Land Policy (2005) outlines the approach taken by the NSW Government to development on floodplains.

The primary objective of the policy is to reduce the impact of flooding and flood liability on individual owners and occupiers of flood prone property, and to reduce private and public losses resulting from floods, utilising ecologically positive methods where possible.

The policy sets out the roles and responsibilities of those involved in planning and controlling floodplain development. These are:

- Councils are primarily responsible for the management of flood prone land. Their role is to establish planning controls and measures to reduce flood risk by utilising the methods set out in the FDM
- The NSW Government, through the Office of Environment and Heritage, provides financial and technical support to councils to ensure that the approach is applied consistently across the state
- Floodplain Risk Management Committees, community based committees established by Council, are responsible for reviewing the floodplain development process and communicating their aspirations concerning the management of flood prone land.

Some other key sections of the policy include:

- Recognition that flood prone land is a valuable resource and should not be sterilised by unnecessarily precluding its development
- Promotion of a flexible merit based approach to be followed by Council and recognition that if strict criteria are applied then some appropriate proposals may be unreasonably disallowed and alternatively some inappropriate proposals may be approved
- Protection for Council and other public authorities against claims for damages, provided they have acted in accordance with the Policy and the FDM (as per Section 733 of the *Local Government Act, 1993*)

2.3.3 NSW Floodplain Development Manual

The FDM sets out the methodology in which floodplain management is undertaken in NSW. It builds upon the approach set out in the NSW Flood Prone Land Policy and provides guidance on how to enact the principles of the policy.

The manual is built upon a risk management approach. It promotes quantification of the probability (how often will floods occur?) and the consequences (what people and assets are exposed, what is the hazard of the water, what are the tangible and intangible damages) to determine the risk. The manual promotes management measures to reduce the risk, either by decreasing the probability, the consequence or both.

The core of the manual is the Floodplain Risk Management Process which sets out an iterative approach to mitigate the risk, then review and determine if the residual risk can be mitigated. The process generally follows:

- Formation of the Floodplain Risk Management Committee
- Data Collection
- Flood Study
- Floodplain Risk Management Study
- Floodplain Risk Management Plan
- Plan Implementation

Figure 2 concisely outlines the floodplain development process. The floodplain development manual is essentially followed for all floodplain management within NSW.

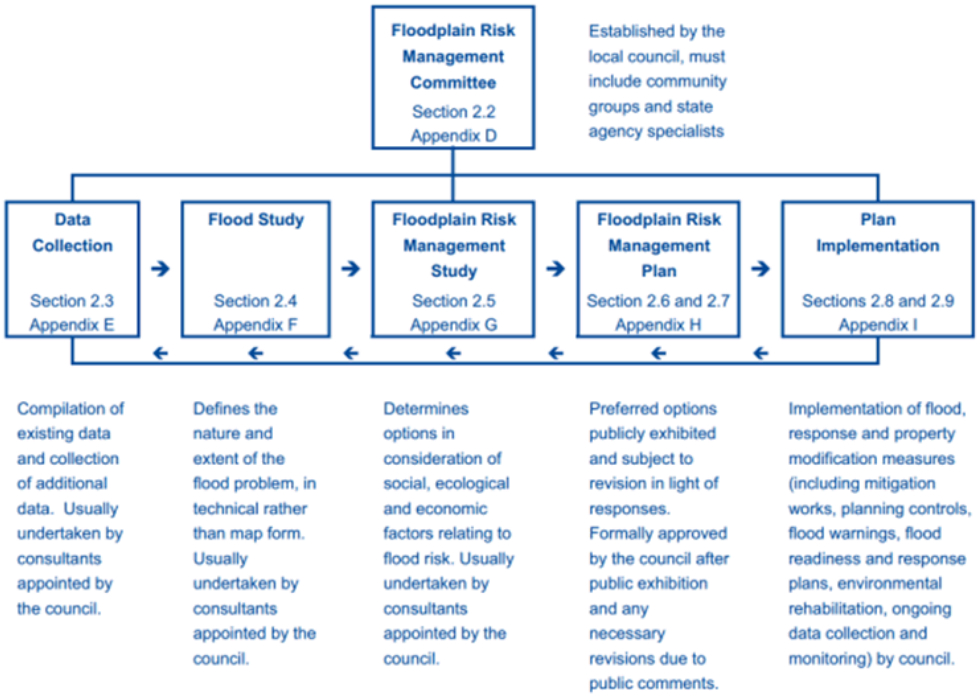

Figure 2: Floodplain Development Process (From DIPNR 2005)

2.4 LOCAL PLANNING INSTRUMENTS

2.4.1 Parramatta Local Environment Plan (LEP) 2011

The Parramatta LEP 2011 applies to the whole area covered by the FRMP. This LEP is a standard instrument LEP and as such the wording and structure are generally set out by the NSW Department of Planning, Industry and Environment. With respect to flood planning, the LEP has a number of conditions that the development must satisfy rather than a number of potential impacts that the consent authority must consider in its determination.

The main conditions for approval are that the development:

- Is compatible with the flood hazard of the land
- Is not likely to significantly adversely affect flood behaviour resulting in increases in the flood affectation of other properties
- Incorporates appropriate measures to manage risk to life from flood
- Is not likely to significantly adversely affect the environment or cause erosion, siltation, destruction of vegetation etc.

The Standard Instrument LEP also sets the flood planning level as the 100 year average recurrence interval (ARI) event plus 0.5 m of freeboard.

2.4.2 Parramatta Development Control Plan (DCP) 2011

The Parramatta DCP 2011 (Included as Appendix B) sets out the development controls with regard to flooding for the Parramatta LEP 2011. One of the aims of the DCP is to assist development in conforming to the requirements of the LEP. Where the LEP lists a requirement for a certain potential impact to be considered, the DCP has been written such that if it is followed, that impact is likely to be minimised.

The DCP uses a matrix of controls depending on the Flood Risk Precinct (Low, Medium or

High) and Land Use Type (Residential, Commercial, Critical Uses & Facilities etc.) and categorises the development controls against a number of aspects, including:

- Floor level
- Building Components
- Structural Soundness
- Flood Affectation
- Car Parking and Driveway Access
- Evacuation
- Management and Design

This approach is consistent with many other Councils within the Sydney Region and is generally considered best practice. However, the Land Use definitions and controls tend to vary between Councils. For example, the Parramatta DCP Matrix would classify a hospital as a "Sensitive Use" while the Fairfield City Wide DCP 2013 and the Bankstown DCP 2015 have classified a hospital as a "Critical Use". The outcome, in terms of planning controls for all three DCPs, is the same for hospitals.

For this project critical controls were compared across the Parramatta, Fairfield and Bankstown DCPs. the controls examined included the floor levels, evacuation and car parking and driveway access controls for the Low and Medium Flood Risk Precincts for Residential and Commercial Development. It was found that the Parramatta DCP was fairly similar to the Fairfield and Bankstown DCPs, with minor variations such as the level of basement car parking (Parramatta uses the 1% AEP plus 0.5 m freeboard, Fairfield the 1% AEP and Bankstown the 1% AEP plus 0.1 m freeboard).

At the time of writing the Parramatta DCP was under review by Council.

The controls set out in the DCP are in line with the objectives of the Floodplain Development Manual 2005.

2.5 PARRAMATTA FLOOD POLICY

Molino Stewart previously reviewed the Parramatta Flood Policy as part of the development of Council's City River Strategy. Council is updating the currently adopted Flood Policy taking into consideration that review.

Four principles influence the current flood policy:

- Flood prone land is a valuable resource that should be managed and developed, subject to a merit approach that provides due consideration to social, economic and environmental criteria, as well as any flooding criteria, as identified in flood studies, independent assessments or strategically developed floodplain risk management studies and plans
- Both mainstream and overland flooding are to be considered when assessing flood risk
- Flood prone land should not be sterilised by unnecessarily precluding development through the application of rigid and prescriptive criteria, however inappropriate proposals should not be accepted
- Measures to increase resilience across the LGA should be encouraged so as to reduce the long term effects of flooding when it occurs.

The Policy is being implemented through the following over-arching processes:

- Preparing co-ordinated development controls
- Establishing a development application process
- Where appropriate and feasible, encouraging the conversion of "High Risk Hazard Zones" or "Floodways" to natural waterway corridors
- Establishing a rolling program of reviews of floodplain risk management studies and plans to ensure flood data is as up-to-date as possible, especially in Council's priority and growth areas
- Establishing an access portal on Council's website to display relevant flood studies, plans and maps adopted by Council

- Implementing a community engagement program, designed to ensure the community in general, and specifically any proponents of development, are aware of the potential flood hazard and consequent risk and liability associated with the use and development of flood liable land.

2.6 FLOOD RESPONSIBILITIES

Table 1 shows the range of organisations involved in floodplain management activities and their diverse responsibilities.

Table 1: Floodplain Management Responsibilities

Floodplain Management Actions		Organisation and its responsibility					
		FMC	**Council**	**DPIE [1]**	**NSW SES**	**Sydney Water Corporation[2]**	**BoM**
Flood Modification	Detention Basins and modifications to drainage infrastructure	Recommend	Approve, Fund, Design, Construct, Maintain	Approve, Co-Fund		Approve, Fund, Design, Construct, Maintain	
	Levees	Recommend	Approve, Fund, Design, Construct, Maintain	Approve, Co-Fund			
	Cleaning Drains	Recommend	Fund and implement			Fund and implement	
Property Modification	Voluntary House Purchase, Voluntary House Raising	Recommend	Approve, Co-Fund	Approve, Co-Fund			
	Planning Controls	Recommend	Draft, Regulate	Approve			
Response Modification	Community Education	Recommend	Approve, Fund, Undertake		Approve, Fund, Undertake		
	Emergency Planning	Recommend	Approve, Fund, Undertake		Approve, Fund, Undertake		
	Flood Warning Systems	Recommend	Approve, Fund, Design, Construct, Operate, Maintain	Approve, Co-Fund	Advise, use		Advise, use

1. DPIE may co-fund some flood mitigation measure using State Government funds or State and Federal Government funds.

2. only has responsibility where drainage assets (principally concrete lined stormwater drains) are SWC assets.

3 EXISTING MANAGEMENT PLAN

3.1 STATUS REVIEW

As part of the update to the Parramatta Floodplain Risk Management Plans, a review of the existing plans was undertaken. The focus of the review was to determine to what extent the existing plan measures have been implemented by Council.

Across the two plan areas there were 39 major recommendations, covering:

- Revisions to planning controls
- Property modifications (voluntary house purchase and house raising)
- Response modifications
- Flood modifications.

A qualitative assessment of the implementation status of the original recommendations follows.

3.1.1 Revisions to Planning Controls

In general, the revisions to planning controls had been completed, or the proposed revisions have become redundant because of changes to planning instruments driven by other considerations.

Some of the issues which have not been fully resolved include:

- changes to wording within the DCP and S10.7 certificates
- investigations into the potential for S7.11 contributions to contribute to flood mitigation measures
- controls on fencing and screening in high hazard and overland flow areas.

3.1.2 Property Modifications

Council has generally implemented the recommended property modifications or upon further investigation has found that they were not feasible.

A number of properties have been voluntarily acquired or raised.

Council is currently undertaking a new flood study that will likely identify a number of areas where further property modifications can be undertaken to mitigate flood risk.

3.1.3 Response Modification

The response modification measures within the plans generally fall within three categories, these are:

- Flood Emergency Response Planning - Council and the NSW SES are continuing to work on the local flood emergency response plans, and significant hydraulic analysis has been undertaken on other areas within the CBD. However, the updates have not been completed because of resourcing constraints, particularly for the Local Flood Plan
- Flood Warning – There is no specific recommendation in either plan regarding flood warning but Council has installed a flood early warning system for the CBD
- Community Awareness and Education - There are a number of recommendations within both plans with respect to community flood risk awareness and community education. Council has implemented its Floodsmart program in association with its warning system implementation. This makes flood related information available of Council's website and there have been other efforts made to disseminate information about flood risks to the community.

3.1.4 Flood Modifications

The existing plans recommended a number of flood modification works, including detention basins and levees and a number of drainage improvements such as culverts and pipes. It was recommended that some be investigated further to determine feasibility. These measures have generally been implemented or otherwise found not to be feasible.

Some investigations are still underway. Some measures have not been put in place because it was determined that it would be more

efficient to resolve the flood problem through re-development.

Additionally, the plans recommended rubbish and vegetation removal and de-snagging within a number of channels. All trunk drainage channels within the CBD area are owned and maintained by Sydney Water. It is understood based on previous advice from Sydney Water that they have a regular operation and maintenance program. Council also requests Sydney Water to clean and remove debris collected within these channels as and when this becomes known to Council and when residents or the general public inform Council through its Service Request System.

3.2 PRACTICAL CHALLENGES

The opportunity was also taken to discuss with Council officers any known practical difficulties or problems which have been identified through implementation of the existing plan.

Discussions with Council officers revealed that the way in which some developments have been built to comply with existing flood planning controls have had unintended consequences or resulted in sub-optimal design outcomes. Issue of main concern are:

3.2.1 Car Parks

If a basement car park is flooded, it will create extremely high hazard waters for anyone that is stuck in the basement or otherwise attempts to access it.

There is a critical difference between basement flooding and over floor flooding. For example, if a normal residence is built at the level of the 1 in 100 Year ARI plus 500 mm freeboard, and a flood level is 0.3 m higher, it will only produce low hazard waters within the dwelling and some property can be protected on tables.

In the same flood, if the flood level is 0.3 m greater than the lip level of a basement car park, it will create an extremely high velocity, high hazard floodway as the floodwaters rush over the lip and into the basement, it will then progressively fill the basement and create extremely deep pools or high hazard water.

For this reason, the DCP discourages basement car parks but if the site requires one it must have be protected to the level of the PMF. Council officers have indicated this can provide significant design challenges.

3.2.2 Critical Infrastructure

As the 2011 floods in Brisbane highlighted, the placement of critical building infrastructure (electricity transformers, lift motors, water pumps) in basements and ground floors can significantly delay the reopening of a building after flooding. Consideration needs to be given to development controls to ensure that this infrastructure is given an appropriate level of flood protection.

3.2.3 Activate Building Edges

An issue which has emerged as developers design buildings in flood prone areas is the connectivity between the footpath and the floor level of the building, particularly in areas where the 1 in 100 Year ARI plus 500 mm freeboard is significantly higher than ground level. This presents an issue for areas such as the CBD where there is typically retail or restaurant development on the ground floor, and the floor level difference presents a barrier to customers. This issue is shown in Figure 3 and Figure 4 where the shop fronts are set back and raised and out of eye level for pedestrians.

Figure 3: Activated Building Edge Example

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3.2.4 Fire Exits

There are many examples of recent development in the floodplain where the fire exit door is set at ground level but the minimum building floor level is considerably higher. All fire exits are required to open outwards from the building, however, if the fire door was required to be used during a flood, this door may be impossible to open as it is likely there would be a higher water level outside than inside, and this head (water level) difference would stop the fire exit door from opening. This is highlighted in Figure 4 where the minimum floor level can be seen by the stairs in the blue building, and the fire exit is shown between the two sets of stairs. Figure 5 also shows this where the steel screen on the right is the level of the floodway (these rise during a flood to allow flow underneath) and is shown to be over halfway up the height of the fire exit.

Figure 4: Fire Exit and Ground Level Example 1

Figure 5: Fire Exit at Ground Level Example 2

3.2.5 Flow Under Buildings

In some areas through the CBD, particularly along Clay Cliff Creek, a number of buildings have been set above the ground level with a gap beneath the building to allow for flow. This has been required as the buildings are situated over floodways and if there was no flow underneath the building it would have an impact on their neighbours.

The issue arises where the area beneath the building is screened off so that there is no access, and these screens, in many cases, would not allow any flow through, as can be seen in Figure 6. In some cases, as shown in Figure 7, the flow area has been further blocked by fencing or other materials in an attempt to enclose the flow area and use it for storage.

Figure 6: Screening Example 1

Figure 7: Screening Example 2

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3.2.6 Early Flood Warning

City of Parramatta Council has installed an early flood warning system for the Parramatta River. It has had a slow uptake of subscribers and Council is looking at ways to ensure more people are receiving and understanding flood warning messages as well as improving the accuracy and timeliness of warnings.

3.2.7 DCP Wording

Council officers and others have observed that some of the wording in the DCP is ambiguous or misleading. This includes the reference to "flood risk precincts" which are essentially a mapping of flood probability which is only one contributor to flood risk.

3.2.8 S10.7 Certificate Wording

Council officers have observed that property inquiries and sales generate the production of Section 10.7 certificates. In Parramatta the Section 10.7(2), which legally must accompany any property sale contract, only makes some general statements about the flood affection of the property. A more detailed Section 10.7(5) certificate can be purchased to obtain the more detailed information about flood affection of the property.

Council officers want to consider ways in which it could be made clear that the S10.7(2) certificates do not contain all flooding information. Recommended that a guide to making the decision of purchasing S10.7(2) or S10.7(5) is included within the application form.

3.3 MANAGEMENT OPTIONS

Table 2 shows the potential options to be included in the updated plan. These measures are based on the existing plan review, discussion with council officers and field inspections. Some are updates to measures that were recommended as part of the existing plans.

Table 2: Potential Management Options Arising from the Existing Plan Review

Measure Type	Proposed Measure	Source
Planning Control	Revise the wording of the DCP and S10.7 Certificates	Upper and Lower Parramatta Plan, Council officers
Planning Control	Council to consider ways in which S7.11 contributions could be made towards flood mitigation projects.	Upper and Lower Parramatta Plan, Council officers
Planning Control	Council to develop a policy with respect to fencing and screening within floodways. This policy could result in provision of appropriate staffing levels to allow existing floodways to be inspected to ensure pathways are still clear.	Lower Parramatta Plan, Council officers
Planning Control	Review the requirement for basement car parks to be protected up to the level of the PMF.	Council officers
Planning Control	Consider introducing planning controls for the protection of critical building infrastructure	Council officers
Planning Control	Consider planning controls which enable the activation of building edges at street level	Council officers
Planning Control	Consider planning controls which reduce the risk of fire doors being blocked by floodwaters	Council officers
Response Modification	Council to encourage the NSW SES to finalise development of the Local Flood Sub Plan	Lower Parramatta Plan, Council officers
Response Modification	Council review the availability of flooding data to the public and develop a community awareness and education policy and program for ensuring the population at risk is aware of the flood risks to life and property.	Upper and Lower Parramatta Plan
Response Modification	Council continues developing the Flood Early Warning System for Parramatta CBD and includes a program for review and continuous improvement of the system and means of disseminating more accurate and timely warnings to more people.	Council Officers
Flood Modification	Council to encourage Sydney Water to conduct a review of the maintenance program for the channel including removal of rubbish and excess vegetation	Lower Parramatta Plan

4 THE PLANNING PROPOSAL

The planning proposal for the CBD Strategy is to allow for the expansion of the Parramatta CBD boundary as well as amendments to a number of building controls within both the current CBD and the extended CBD area. Primarily these building controls relate to Floor Space Ratios (FSR) and building height restrictions.

The net effect of the planning proposal is to increase the capacity of the CBD both in terms of commercial and residential floor space. This increase in floor space is effectively on top (i.e. higher) than the current development and does not open up any new areas (green fields) for development.

It should be noted that the current controls on the development within and around the CBD allow for reasonably significant redevelopment of the planning proposal area.

In a general sense, the planning proposal would allow the development in the core part of the development for buildings up to around 50 storeys, as opposed to the existing controls which allow buildings up to around 30 storeys, while around the fringes it would allow buildings up to 10 to 30 storeys where buildings of around 5 storeys are currently allowable.

4.1.1 Built Form

Given the current and projected demands for space within the Parramatta CBD area, all re-development is likely to be for the construction of "high rise" buildings for either commercial office space or for residential apartments. Many of these developments will have retail or hospitality establishments on the ground floor; others may be limited to foyers on the ground floor. Car parking will be located either on basement levels or above the ground floor.

4.1.2 Planning Controls

The Parramatta DCP 2011 would classify the land use as either Commercial or Residential (with respect to flooding). For Residential development, the development could also be considered as within the Concessional Development Land Use category, the controls on concessional development are relatively similar to residential development, with some extra conditions such as maintaining floodways.

The DCP planning considerations for both Residential and Commercial are the same for all flood risk precincts with the exception that in the low flood risk precinct a residential development is required to have reliable pedestrian and vehicle access to an area above the PMF (either on site or off site) whereas for commercial development this is not required.

All new residential and commercial buildings would have to have minimum habitable floor levels above the flood planning level which is 0.5m above the level of the 100 ARI flood.

As all new buildings which are redeveloped as a result of the new CBD Strategy will generally be taller than 10 m, it is expected that the redevelopment would provide areas within each building above the level of the probable maximum flood (PMF).

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5 FLOOD RISK ASSESSMENT

In accordance with the requirements of the Section 9.1 Direction 4.3A, a flood risk assessment has been undertaken on the CBD Strategy planning proposal. This has been undertaken in accordance with the principles and guidelines of the NSW Floodplain Development Manual and Flood Prone Land Policy. This chapter explains how it was undertaken and the results of the analysis.

5.1 FLOOD RISK APPROACH

The approach taken to this flood risk assessment conforms to the principles of the NSW Floodplain Development Manual (2005). Where possible we have quantified the change in flood risk due to the planning proposal and where quantitative analysis was not possible or not appropriate we have made some qualitative assessments.

The approach was to define the existing flood risks to the existing population at risk and then examine how both the flood risks and population at risk will change due to the planning proposal and to determine whether these changes are significant.

5.2 DATA USED

5.2.1 Flooding Data

Flooding data was provided by Council covering the two original plan areas. For both areas the data provided was produced by MIKE11 one dimensional models.

For the Lower Parramatta River area, the model was developed over a period of time and updated as part of the Flood Study Review, completed in 2005 by SKM. The model utilised over 600 cross-sections and included detailed representation of the Clay Cliff Creek waterway system.

For the Upper Parramatta River area, the model was first developed by the then Department of Water Resources and the Upper Parramatta River Catchment Trust in the early 1980's. Significant work has been undertaken over the years since then to refine the model. The Draft 8 Version of the model has been adopted by Council and the data from this version has been provided and used as part of this study.

The flooding data that has been provided for the area includes:

- Flooding extents from the 20 Year, 100 Year Average Recurrence Interval (ARI) and PMF design events from the Upper Parramatta River and Lower Parramatta as well as other studies that have been undertaken.
- The low, medium and high hazard areas as defined by Parramatta Council (see section 5.3.3).
- Results from the two MIKE11 models (Upstream and Downstream extents) for a range of events in the native DHI .res11 format

The flood model data has been developed over a long period of time and integrates a significant amount of data and intelligence that has been gathered over that time. However, since the time of its development, the modelling software and techniques that have been used have become dated and no longer represents best practice in floodplain risk management. Therefore, there are some limitations to, and assumptions that have been made in respect of, the analysis that has been undertaken due to the limitations to the model results provided.

Council is in the process of preparing a new two dimensional flood model which would include the CBD study area but that was not available at the time of writing.

5.2.2 Topographic Data

Contour data was provided by Council at a 1 m contour interval. This has then been processed into a Digital Elevation Model (DEM) with a 1 m grid resolution. While this process requires some data interpolation, the DEM, with an appropriate colour ramp, is easier to interpret than contour information.

The contour data would also miss any topographic variations that are less than a metre in range. However, the data has primarily been used to determine the Flood Emergency Response Classification of Communities (see Section 5.5.3) and in this process it is unlikely that small topographic variations would have an impact.

5.2.3 Infrastructure and Administrative Data

Infrastructure and Topographical Data has been provided in GIS vector format for a range of features, including:

- Road Centrelines
- Stormwater Pipe and Pit Network
- Watercourse Lines
- Cadastral Parcels

5.2.4 CBD Strategy Planning Proposal Data

The CBD Strategy Planning Proposal data was provided as a GIS layer with features on a lot scale. The layer included floor surface areas (FSA) under the current planning controls (Current Scenario) and for two future scenarios: one where residential development is allowed in the commercial core (FSAR2), and the other where it isn't (FSAR1).

The analysis removed lots where the potential for redevelopment is low, either due to other constraints (e.g. heritage) or if the ownership is too divided (strata titles with greater than 10 owners). Our analysis was only undertaken on the lots that had been provided as part of the floor space analysis.

We took the floor space areas and converted them into a population at risk using the methodology supplied by Council.

For residential FSA we assumed that there will be:

- One dwelling per 100m^2
- 2.33 people per dwelling

For Commercial FSA (both office space and retail) we assumed that there will be:

- One job per 24m^2

As a way of simplifying the data, and as a conservative estimate, we rounded all population estimates up to the nearest integer (or person).

Subsequently, Molino Stewart was commissioned to undertake a detailed evacuation analysis and for that a more comprehensive estimate of population at risk was prepared. That used current and future development scenarios based on existing FSAs of buildings which are unlikely to be redeveloped in the next 30 years and FSAs derived from the incentive floor space ratios (FSRs) in the draft CBD planning proposal. The methodology is detailed in the Parramatta CBD Flood Evacuation Assessment Report (Molino Stewart, 2019). Where appropriate, in this report refers to these numbers.

5.3 NATURE OF THE FLOODING

5.3.1 Flood Mechanism

The primary source of flooding is from the Parramatta River, with the majority of water sourced from upstream of the CBD. The river rises and breaks its banks and expands laterally into the floodplain through the CBD area.

Some areas within the CBD can also be flooded by local overland flow from intense rainfall overwhelming the drainage system without any significant flooding in the River.

Other areas of the CBD are affected by overbank flooding in the Brickfield Creek and Clay Cliff Creek floodplains.

5.3.2 Flooding Patterns

The first streets to be inundated south of the river are the main roads O'Connell Street, Marsden Street, Church Street, Smith Street, Phillip Street, George Street, and Macquarie Street. These flood because local runoff overwhelms the underground drainage system, particularly if the river level is high or drainage inlets are blocked by debris.

From these main roads the flooding spreads throughout the CBD, cutting off many evacuation routes and creating low and high flood islands. Because the CBD is relatively flat, this flooding is generally low velocity with depths varying depending on the local topography.

In events larger than the 1% AEP flood the river breaks its banks south of the river and spreads high velocity floodwaters through the CBD streets. The initial breakout point is just upstream of O'Connell Street.

Wilde Avenue is the first area north of the river to be inundated. Other than Wilde Avenue, the areas north of the river are gradually flooded as the water spreads north across the floodplain.

Flooding also occurs as a result of overbank flooding in the Clay Cliff Creek floodplain. This flooding generally follows the path of the creek from Ollie Webb Reserve, through the CBD to Robin Thomas Reserve, and then progresses laterally across the floodplain. The areas first affected are around Lansdowne Street, Church Street, Parkes Street, Wigram Street, and Hassall Street. The one dimensional modelling suggests that the 20 year ARI event would flood a wide swathe along either side of Clay Cliff Creek.

Brickfield Creek flooding enters the CBD area by crossing Victoria Road and then down Wilde Avenue towards the Parramatta River. In larger floods, in conjunction with overbank flows from the Parramatta River, it can spread west and flood the area between Victoria Road and the River up to Marsden St

Council's currently adopted flood extents for the 20 and 100 Year ARI and the PMF are shown in Figure 8 and the council defined flood hazard layers are shown in Figure 9.

5.3.3 Flood Depths, Velocities and Hazard

a) Depth

Depths are greatest in the areas directly adjacent to the river and on the roads and vary across the floodplain typically decreasing moving laterally from the river. In some areas there are significant depths within the PMF, where a depth of 3 m would likely inundate the entire bottom floor of a building. Figure 10 shows the distribution of depth through the floodplain for the PMF. It was not possible to produce a similar depth map for other events due to the limitations of the Mike11 outputs.

In areas of shallow flooding the flood extent in Figure 10 does not align exactly with the PMF extent in the other figures because there must be slight differences in the ground level values in the topographic data in the flood model and that which was available for the analysis in this report .

b) Velocity

The current modelling uses a "Section Average" velocity, which essentially applies a velocity to the whole channel, so it assumes that the edges of the floodplain are flowing in the same direction and at the same velocity as the primary channel. In reality it is likely that the river portion of the floodplain will be flowing considerably faster than the areas through the CBD and the edge of the floodplain would have minimal velocity.

Due to this modelling assumption it is difficult to ascertain local velocities through the floodplain.

c) Hazard

Flood Hazard data has been provided by Council and is shown in Figure 9. This hazard representation closely aligns with the extents of the 20 Year ARI for high hazard, 100 Year ARI for medium hazard and PMF for the low hazard. We have used this as the basis for our representation of hazard to be consistent with Council. However it should be noted that the typical approach to flood hazard mapping is to produce hazard variations within a single event. For example, there are areas within the low hazard area that would have water depths of over 4 m in a PMF. A depth of 4 m would be described as high hazard in most circumstances.

It is likely that the hazard data has been produced in this way (extent based, rather than depth and velocity based) due to the limitations of the model software that has been used to develop this data.

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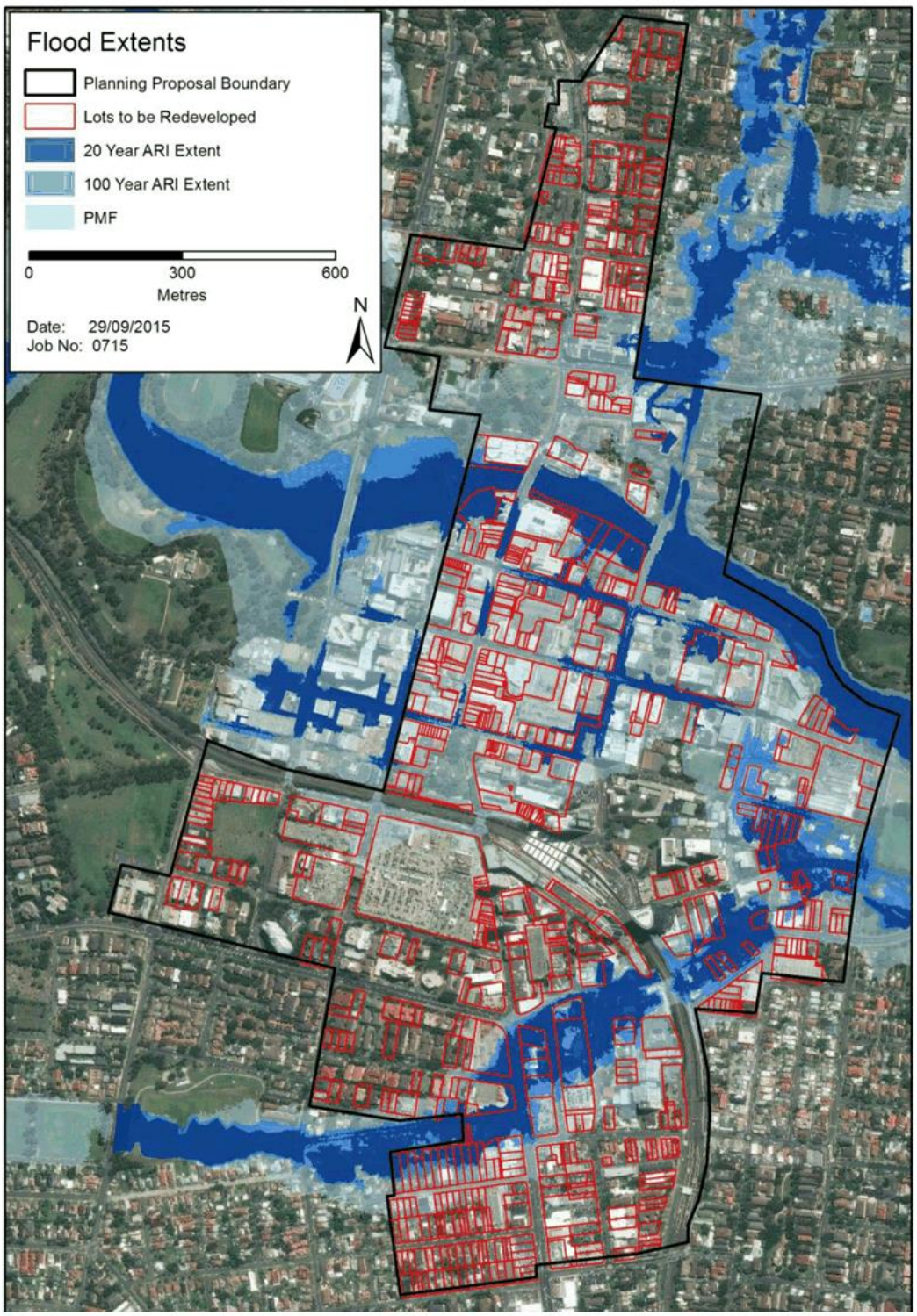

Figure 8: Flood Extents through the study area

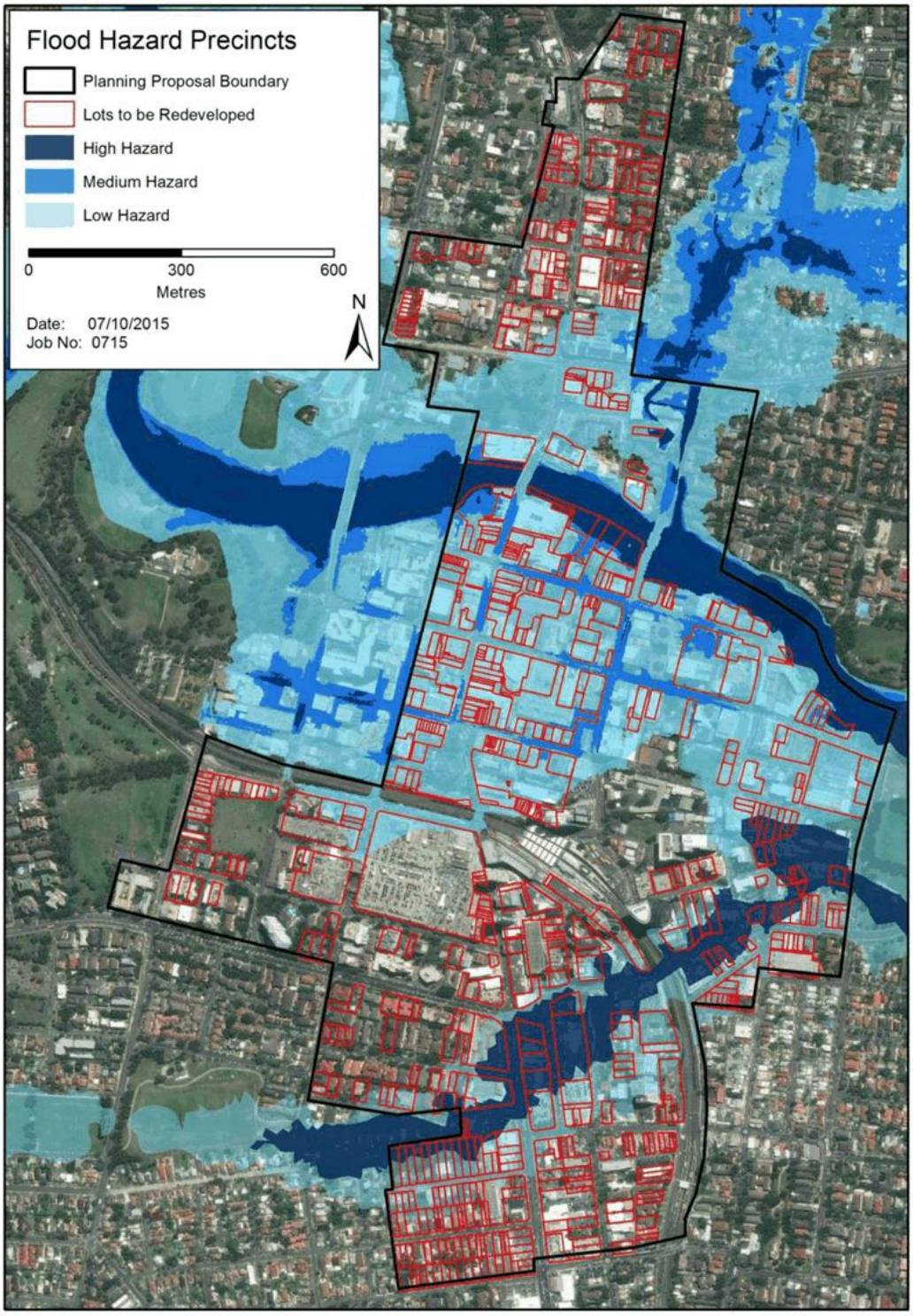

Figure 9: Flood Hazard Precincts

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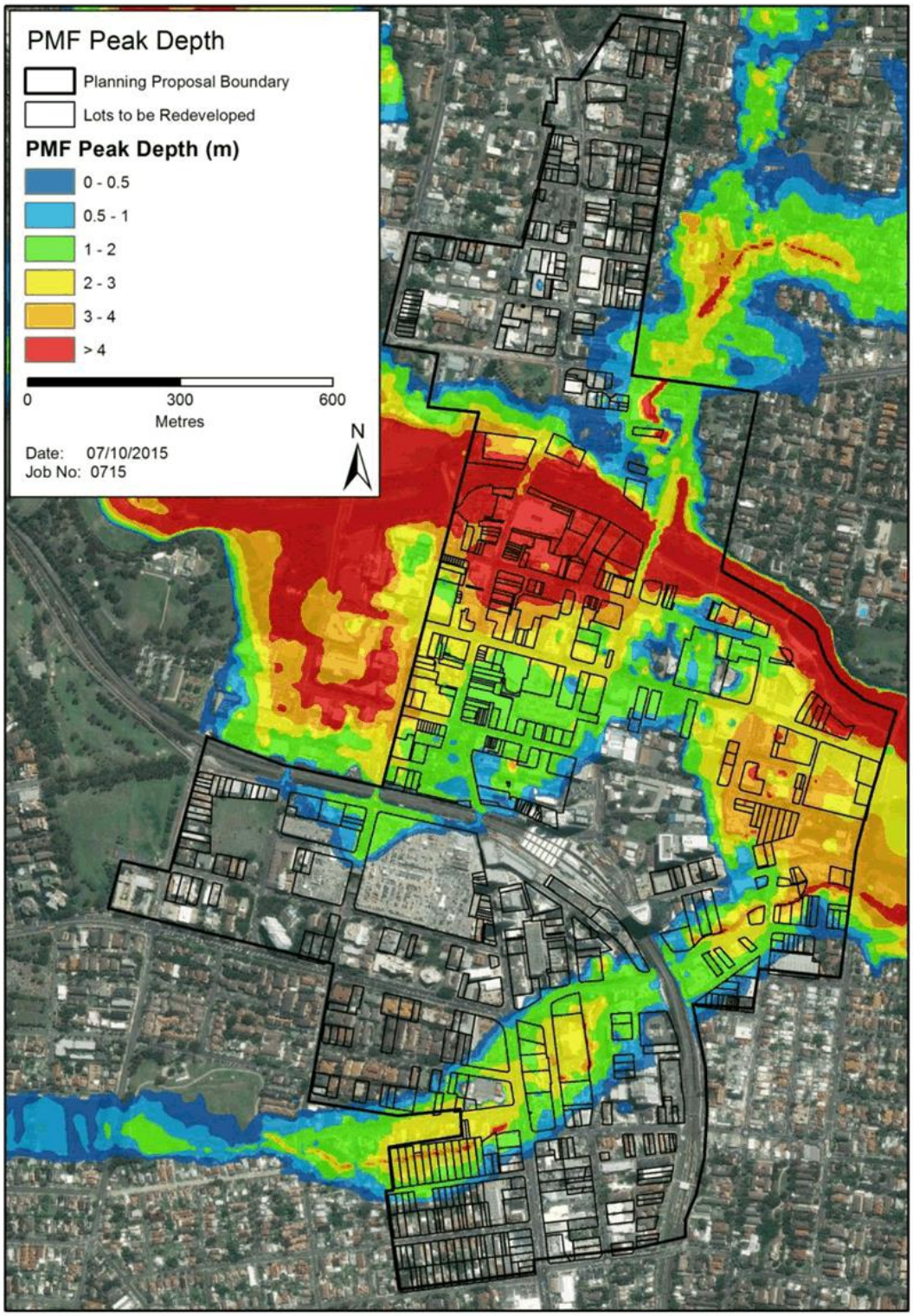

Figure 10: PMF Depth Map

5.3.4 Flood Rate of Rise

The flood rate of rise in the Parramatta River is relatively quick, particularly for the PMF. Figure 11 shows the water surface levels for the 100 Year ARI event and the PMF for just upstream of the Marsden St Weir, which is located just upstream of the study area. Figure 12 shows the same water surface levels for the Charles St Weir, which is at the downstream end of the floodplain.

The average flood rate of rise (across both locations) is around 0.4 m per hour for the 100 Year ARI and 1.6 m per hour for the PMF. The PMF rate of rise is extremely rapid with peak flood levels achieved around five hours after the river has started to rise and levels greater than the peak of the 100 Year ARI event are reached two hours after the river begins to rise.

5.3.5 Flood Durations

Flood durations are the longest in areas directly adjacent to the Parramatta River. These areas are the first to be inundated when the river breaks its banks and would remain under water even when the flood had receded from other areas.

The parts of the CBD with the longest duration of flooding are on Phillip Street between Marsden Street and Smith Street. Lots in this area would be inundated for up to 9.5 hours in the PMF. Figure 13 shows the spatial distribution of the flooding duration for the PMF and Figure 14 shows a frequency distribution for flood durations.

Another area of longer duration flooding is near the northeast end of Clay Cliff Creek. The areas between George Street, Hassall Street, Charles Street and Harris Street would be flooded for between 5 and 6 hours.

Most other areas in the study area would be flooded for less than 5 hours, with an overall average duration of inundation being 4.5 hours in the PMF and over 83% of lots being inundated for less than 6 hours in the PMF

In smaller events, such as the 100 Year ARI flood, only around 27% of the PMF affected lots would be inundated and these would be inundated for a significantly shorter period of time.

5.3.6 Summary of Flood Behaviour

Flooding in the Parramatta CBD is typical of flash flood catchments. Flooding arrives quickly and without significant warning time, while at the same time it also recedes quickly with an average flood duration of less than 5 hours for even the most extreme floods.

In most floods, the flooding is confined to a relatively narrow river corridor. The currently adopted modelling suggests the flood depth in the Clay Cliff Creek floodway will be very high, even in smaller floods such as the 20 Year ARI and this area appears to present the greatest risk to existing and future development. .

In a PMF, which has an estimated 100,000 Year ARI, there is widespread flooding that is relatively deep through large areas of the floodplain.

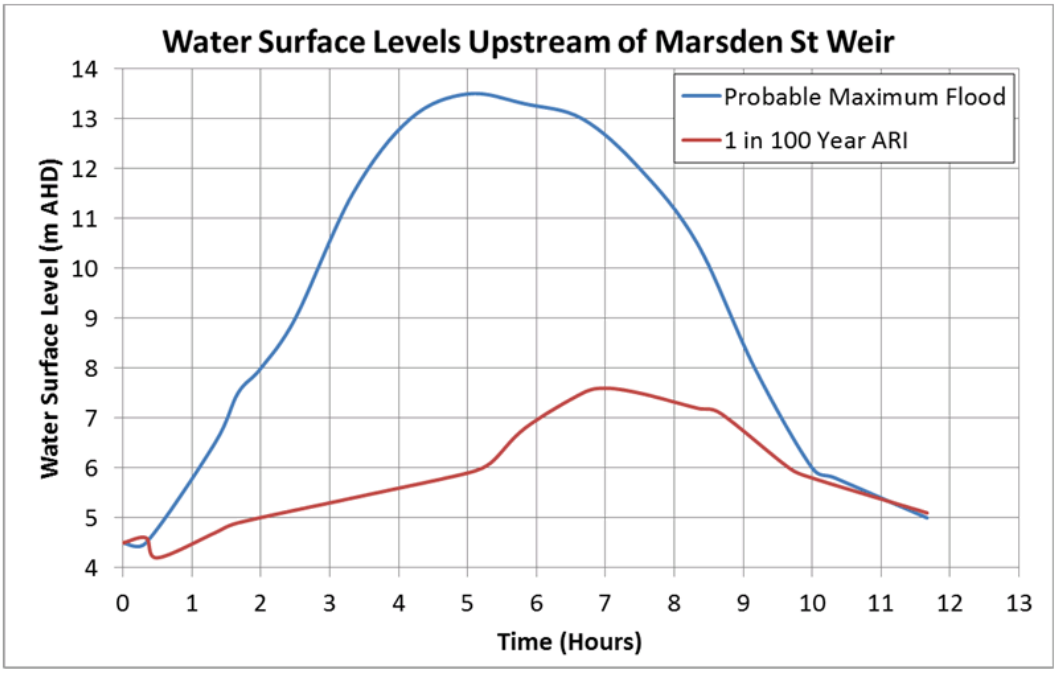

Figure 11: Water Surface Levels Upstream of Marsden St Weir

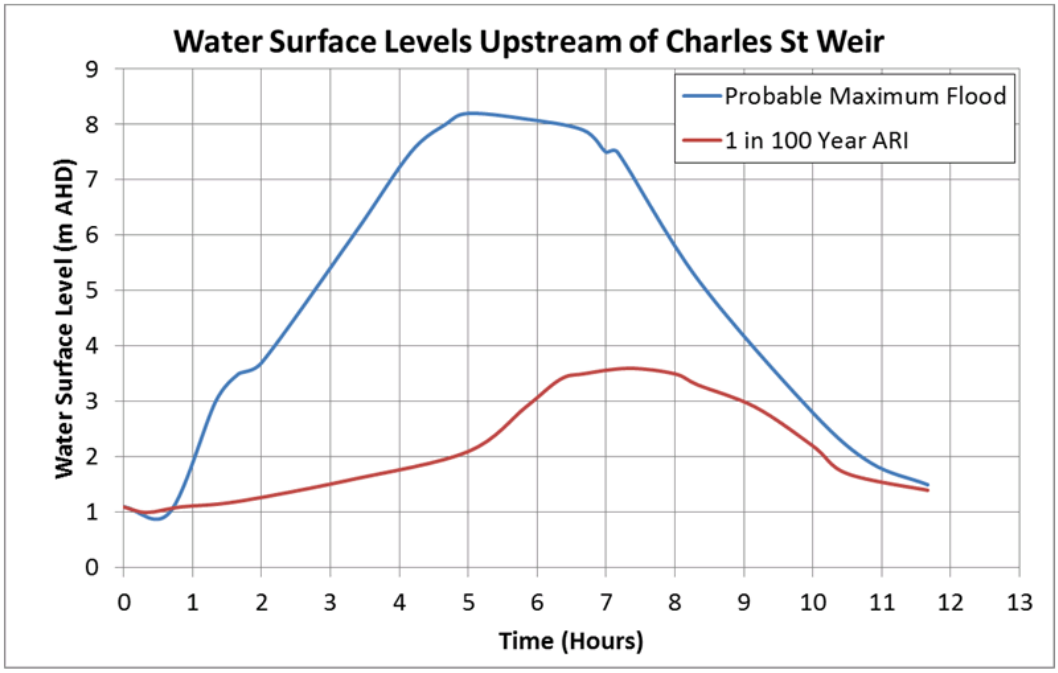

Figure 12: Water Surface Levels Upstream of Charles St Weir

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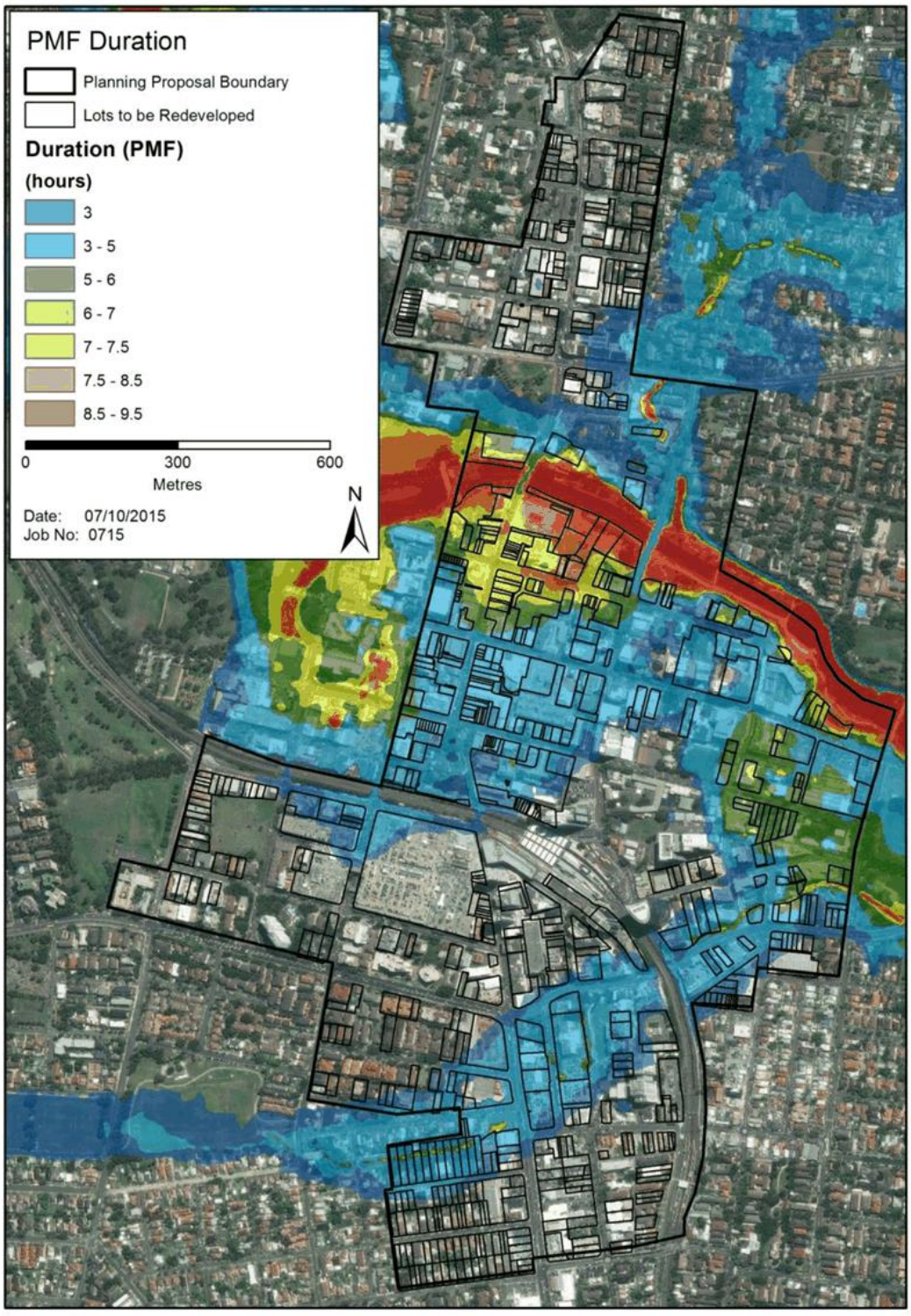

Figure 13: PMF Flood Durations

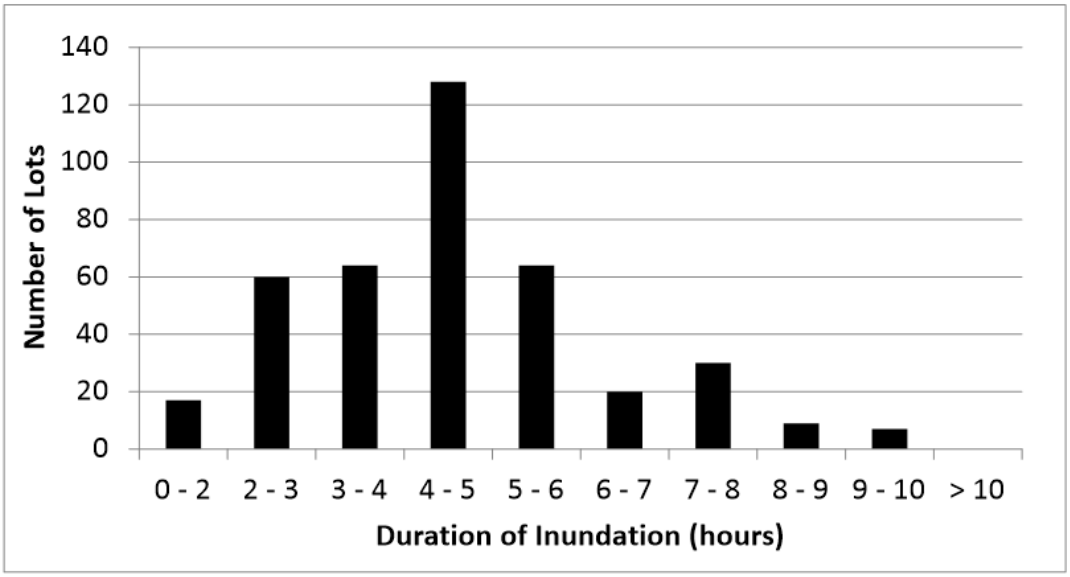

Figure 14: PMF Flood duration distribution

5.4 OTHER PLANNING AREAS

The "Planning Investigation Area" located around the fringes of the planning proposal area is currently being examined for potential changes to the planning controls and to be incorporated into the CBD planning area.

Figure 15 shows the extent of the Planning Investigation Area, and also the Parramatta North Urban Renewal Area (a state managed redevelopment precinct).

It can be seen that the Planning Investigation Area is almost completely flood free and would have limited flooding constraints, should these areas be subject to redevelopment. It is suggested that if flooding constraints are too great in the current planning proposal area, then re-development of the planning investigation area may compensate for any loss of floor space yield.

The new flood study that is being undertaken may identify new areas within the Planning Investigation Area that are flood affected; particularly areas that are subject to local overland flows.

The Parramatta Urban Renewal Area on the other hand is almost entirely within the PMF extent and this needs to be taken into consideration in its planning and the imposition of development controls.

There is also an area of the CBD between Parramatta Park and Marsden Street which is referred to as the "Western Corridor" which is also shown in Figure 15. This area is not included in the Planning Proposal because heritage considerations prevent it from having its building heights increased. Nevertheless, this area would need to evacuate with other parts of the CBD during a flood and accordingly was considered in any CBD evacuation analyses.

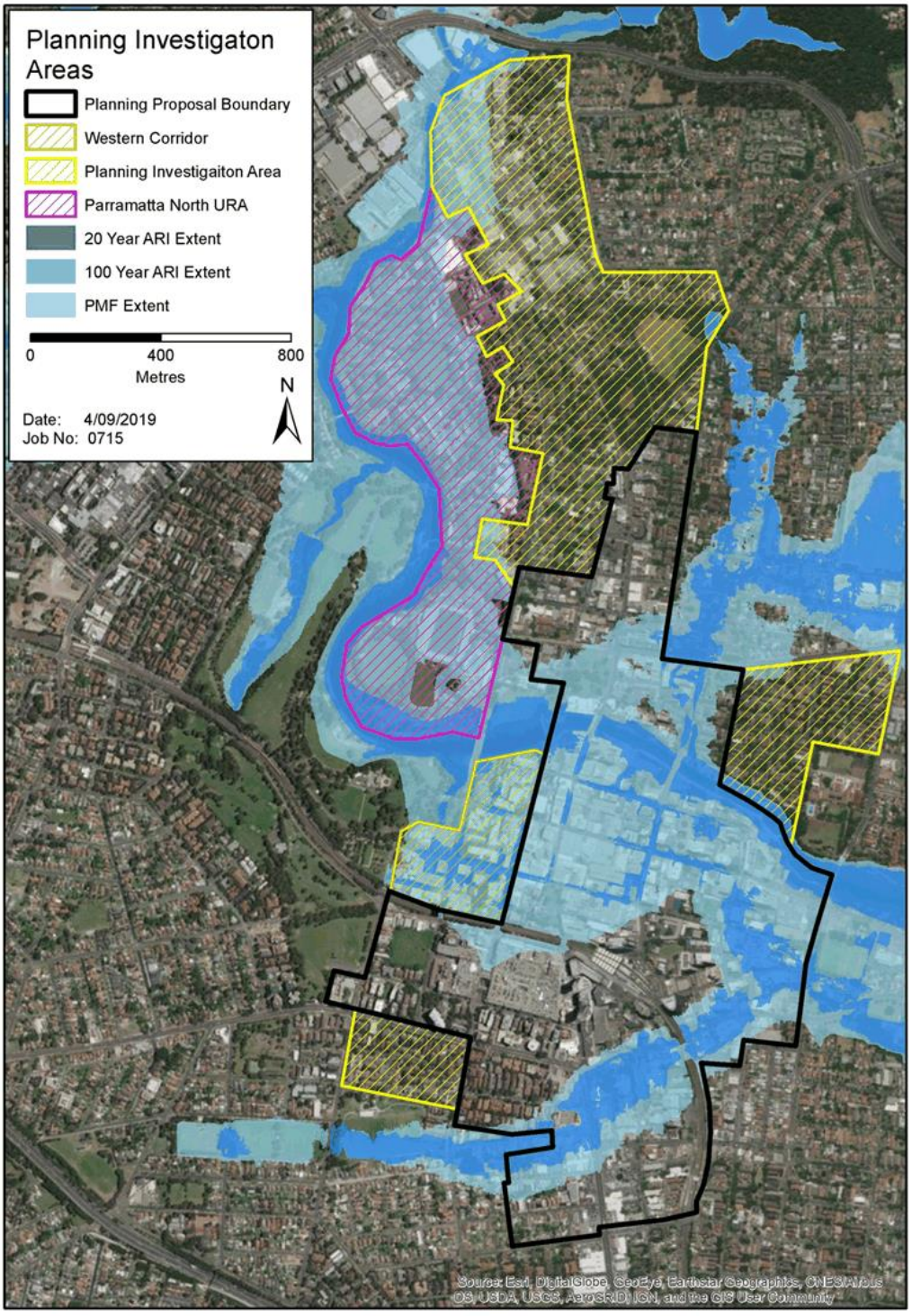

Figure 15: Planning Investigation Areas and Flood Extents

5.5 FLOOD RESPONSE

5.5.1 Available Warning Time

Flood warnings are generally provided by the Bureau of Meteorology (BoM) for developed catchments such as the Parramatta River. However, due to the small size of the catchment and therefore rapid rise of the Parramatta River there is insufficient time for the BoM to issue a warning prior to a flood occurring. Previous studies have shown that it will take approximately 6 hours to develop peak floods levels around the Parramatta CBD area during a large flood (larger than 20 Year ARI) although as discussed in Section 5.3.4 flooding can occur much faster than this.

For this reason the BoM has not developed any flood classification levels (minor, moderate or major) for the Parramatta River nor does it maintain a gauge in the river for flood warning purposes. The State Flood Emergency Sub Plan states that the only warning available for the catchment is a Severe Thunderstorm or Severe Weather Warning provided by BoM. These warning products do not provide a quantified level or time to the flood occurring.

In most circumstances a severe weather warning will not result in significant flooding and therefore the emergency services will generally not mobilise for mass evacuations based on these warnings.

The tributaries that are within the Planning Proposal area, such as Brickfields Creek and Clay Cliff Creek, are significantly smaller than the Parramatta River and flood waters will rise much faster. BoM gives no quantified warnings for them.

Since the preparation of the original draft of this report, City of Parramatta Council developed an early warning system for the River which would potentially provide some warning time for floods on the river. The service issues minor, major and moderate flood warnings for various sub-catchments of the Upper Parramatta River including the CBD. This system is expected to give about two hours warning but this could be considerably less in the more extreme floods which are likely to flood the CBD. It only provides warnings for the Parramatta River and Brickfields Creek but not for Clay Cliff Creek.

5.5.2 Local Flood Planning

The Parramatta Local Emergency Management Plan (EMPLAN) replaced the Parramatta Local Disaster Plan (DISPLAN) which was in place in 2016. The EMPLAN identifies flooding, amongst other hazards, as posing a medium risk to Parramatta. The EMPLAN cross references to a Local Flood Sub Plan but that had not yet been completed by the NSW SES in September, 2019 when the draft of this report was prepared.

The NSW SES receives flood warnings from the Parramatta River Flood Warning System which uses forecast rainfall as part of its suite of inputs to flood forecasting. However, with only about two hours warning available, it would be challenging for NSW SES to co-ordinate a response before the flood has peaked.

It is understood that significant developments within the floodplain have been approved provided that there is an adequate flood emergency management response plan in place for that particular development. Similarly, for large development areas (such as the river foreshore), Council has produced evacuation strategies for the river precinct that any future development must comply with (Parramatta City River Strategy, PCC 2015b).

5.5.3 Emergency Response Classification

The NSW SES, in conjunction with the former NSW Department of Environment and Climate Change, has developed a topographic classification system known as the "Flood Emergency Response Classification of Communities" (DECC, 2007). The classification indicates the flood risks associated with the topography and assists the NSW SES and other floodplain managers in determining which areas should be given priority for evacuation and what challenges the topography presents to evacuation.

For example, a "low flood island" is where the evacuation route for an area is cut before it is subsequently inundated. These areas are generally high risk because if people fail to evacuate until it looks as though their premises are in immediate danger it will be too late and they will then potentially need to be rescued. A "high flood island" is similarly isolated by flooding, however, the occupants could still escape to an area above the flood waters.

"Areas with rising road access" are of less concern, as the occupants can still evacuate by vehicle or on foot along a formed roadway even if they don't leave their premises until the floodwaters present an imminent danger. Similarly, "Areas with overland escape routes" may not have rising road access but at least they will be able to escape on foot to areas above the level of the PMF.

The lots within the planning proposal area were classified in accordance with this system and the results are show in Figure 16 for the whole planning proposal area and Figure 17 for those lots that have been marked for potential redevelopment. The classification was undertaken based on ground levels in the dataset provided originally.

It should be recognised that buildings in areas classified as low flood islands are effectively high flood islands if they have internal access to areas above the reach of the PMF. Similarly, apartments and offices above the ground floor in areas classified as having rising road access or overland escape routes effectively become flood islands if they fail to evacuate when the ground floor of the building is threatened by flooding.

a) Low Flood Islands

Due to the fact that the roads are some of the first areas to be flooded in the CBD, there are large areas which are classified as low flood islands. The entire area of the CBD between the river to the north, Macquarie Street to the south, Marsden Street to the west and Smith Street to the east is a low flood island. East of here it also extends between the River and George St to Harris St.

North of the river, the lots which would evacuate onto Palmer Street are a low flood island.

b) High Flood Islands

There is only one HFI in this study area. A small area around Lamont Street, north of the river would be cut off from evacuation but still be able to reach flood free land.

c) Overland Escape Rote

Some areas near Parramatta train station would not be able to evacuate by road due to flood waters, but would still be able to evacuate on foot using an overland escape route. These areas are all between Macquarie Street, the rail line, Marsden Street, and Smith Street. People would be able to walk along grass and paved areas near St Johns Anglican Cathedral and Church Street to get to flood free land south of the train line.

d) Rising Road Access

Areas with rising road access are those lots which are able to evacuate by road before the route is cut by floodwater.

There are many areas in the floodplain which are classified as having rising road access.

The areas between Macquarie Street and Campbell Street which have not already been classified have rising road access along either Marsden Street or Smith Street.

There are also some lots between George Street and Hassall Street which have rising road access either to the south along Harris Street or west along Macquarie Street.

All lots along Clay Cliff Creek which are affected by flooding have raising road access either to the north or south of the creek.

e) Not Affected

All lots in the study area which are not directly affected by flooding are classified as "not affected." These areas are not inundated by floodwaters, do not require evacuation and occupants are theoretically able to come and go at any time during a flood. However, it should be recognised that they may be indirectly impacted by flooding either through loss of utility services or through having some, but not all, of their access routes cut.

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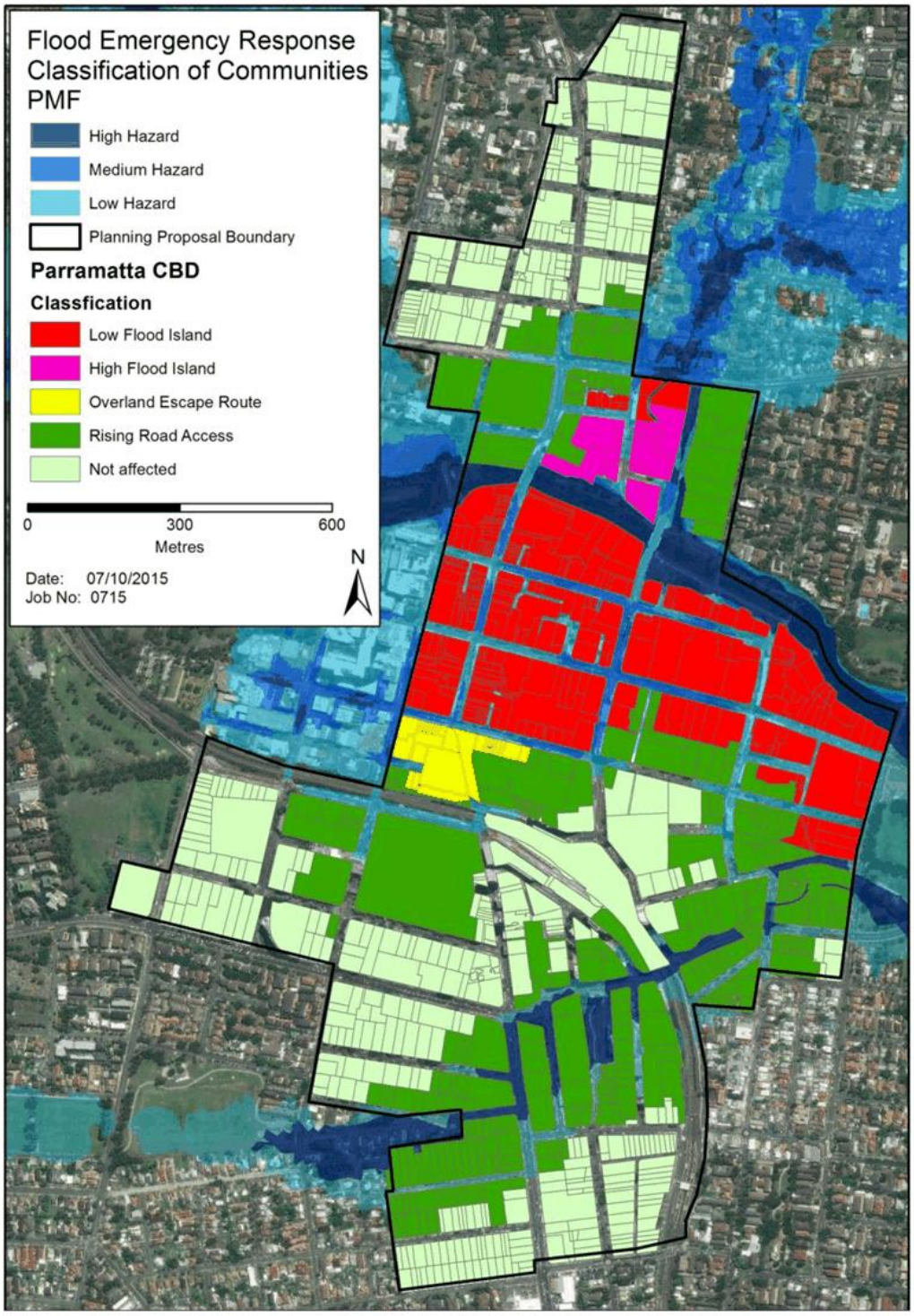

Figure 16: Flood emergency response classification of communities across the CBD

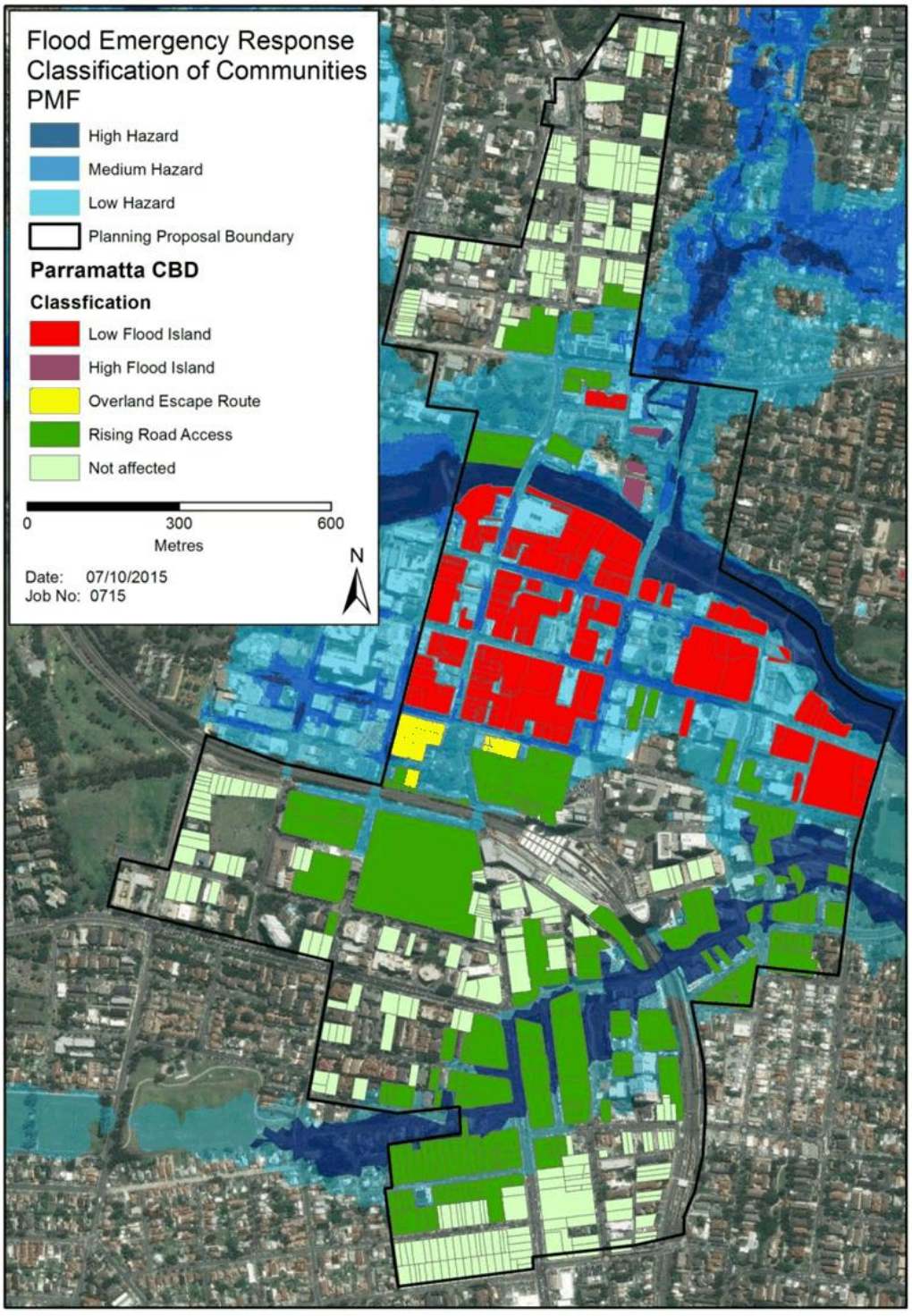

Figure 17: Flood Emergency Response Classification of Communities on developable lots

5.5.4 Evacuation

With respect to flooding, there are generally two main forms of response:

- Evacuation outside of the floodplain to a place of refuge that is above the extent of the flooding
- Shelter in place, sometimes referred to as vertical evacuation, to a location within the building which is above the reach of the PMF.

The NSW SES is primarily responsible for the management of flood emergencies and has a long and strongly held policy of using evacuation outside the floodplain as the primary means of reducing risk to life. The NSW SES is not supportive of new development which relies on sheltering in place as the primary means of reducing risk to life.

However, in the specific case of the evacuation of the Parramatta CBD the preferred SES approach would be problematic for a multitude of reasons. Following completion of the original draft of this report, Molino Stewart was engaged to investigate evacuation options for the CBD in detail (Molino Stewart, 2019). The following is a summary of the findings of the Parramatta CBD Flood Evacuation Assessment report.

a) Vehicular Evacuation

The analysis found that, under existing development, the most number of vehicles would have to evacuate if an evacuation were called during the day. These would principally be workers and visitors in the CBD rather than residents who live in the CBD.

In a 20 Year ARI flood about 9,500 vehicles may need to evacuate, increasing to about 11,500 in the 100 Year ARI flood and increasing to more than 14,000 in a PMF.

About 85% of these vehicles would need to make their way to the Great Western Highway as their principle evacuation route out of the CBD. The other evacuation traffic would be distributed between evacuation routes along Pennant Hills Road, Victoria Road, Church Street and Harris Street.

It was found that trying to safely evacuate all of these vehicles presents several challenges.

1. There are drainage capacity issues within the CBD which would likely flood the local streets early in a flood and prior to them flooding from floodwaters arriving directly from the river.
2. There are multiple traffic signals and one way roads through the CBD, as shown by Figure 18. From the centre of the CBD, around Church St or the car parking facility in Horwood Place, any evacuation would need to go through at least 4 sets of traffic lights which may be inoperable due to loss of power in the flood. This could create gridlock in the road network and floodwaters could overtake people sitting in their cars.
3. The recently developed Parramatta River Flood Warning System is likely to only provide about two hours warning of CBD flooding and possibly less in large, rare flood events in the River. However, the rapid rate of rise of extreme floods means that many of the roads in the CBD would be too dangerous to use before it is known exactly which areas will need to evacuate.
4. The flash flood nature of the flooding means that there would not be the six hours which the NSW SES generally needs to mobilise its staff and volunteers and other emergency responders under its command to conduct door knocking or traffic control operations.
5. There would certainly be no opportunity for the NSW SES or other emergency responders to have time to door knock each building which is the NSW SES preferred method of ensuring most people are reached by an evacuation order.

Figure 18: Traffic Signalling and One Way Roads in the Study Area

6. An evacuation order which has been broadcast by several means (TV, radio, internet, telephone, mobile devices) would have to be relied upon but there is no certainty that all people working in an office environment or sleeping in their apartment would receive the message.
7. The NSW SES, in its evacuation modelling, assumes that it takes two hours for people to begin evacuating once they have received a warning: one hour to accept that the warning is for them and an additional hour to prepare to evacuate. In those two hours the river could have risen to a level which cuts their evacuation routes.
8. Given that it could take two hours for people to be ready to leave in their vehicles and in that time the river could have risen above the 100 year ARI level, water could be on the point of flooding a number of basement car parks which have been constructed under the current planning controls. This could potentially expose people to extreme hazard flood waters as water overtops the lip of the carpark and rapidly floods the basement to great depth.
9. There is no clear and intuitive flood free evacuation route or routes out of the CBD with some roads partially blocked by flooding. Without emergency services directing traffic away from flooding, it is likely that many people in their vehicles will attempt to cross flood waters and become stranded, endangering themselves and blocking the road. However, as pointed out previously, there is unlikely to be sufficient time for emergency service personnel to mobilise.
10. If all of the evacuation routes remained trafficable, it is likely to take more than 8 hours to evacuate the core of the CBD via the Great Western Highway. This is comparable to the total duration of even the more extreme floods. In other words, by the time the last vehicles have evacuated the flooding would have already subsided.
11. If evacuation triggers were set at a lower river level to allow sufficient time for evacuation there would be many circumstances where evacuations would be called and then turn out to be unnecessary.
12. Once vehicles leave the CBD, all of the evacuation routes, other than Pennant Hills Road, require crossing a tributary of the Parramatta River. These are likely to be flooding and therefore vehicles may not be able to get very far past the CBD boundaries
13. There is limited queuing capacity on the evacuation routes above the reach of floodwaters. Given that they may be blocked by flooding then many vehicles could be queued back into the rising floodwaters.
14. If there is other through traffic on the roads then the time to evacuate will be longer and the potential for queuing will be greater.

Despite these many challenges, with effective flood emergency response plans for each development, supported by ongoing community education, it may be possible for vehicular evacuation to occur from some of the fringes of the floodplain where:

- the time to flooding is longer
- there is rising road access
- the distance to flood free roads is short
- the route is unlikely to be blocked by tributary flooding or the vehicle numbers are such that queuing back into the floodwaters is unlikely.

However, it is clear that there are too many things which could go wrong with vehicular evacuation for it to be able to be relied upon for flood emergency response. In much of the floodplain, particularly in the heart of the CBD, it is too risky to even contemplate.

It must also be recognised that while thousands of cars enter Parramatta CBD each day, many thousands of people travel to and from the CBD by bus or train. The peak period services span a time frame of less than three hours and in theory have the capacity to

evacuate all of the people who are reliant on these modes of transport. However, the evacuation may need to occur outside of peak service times or public transport services themselves may be disrupted due to the intense rainfall. In fact, the bus services will share routes as the evacuating cars and will face the same challenges.

Furthermore, those areas which are flood islands may be isolated by floodwaters before people can reach the Parramatta Train Station or the Bus Interchange. With no viable alternative way of getting home, these transport hubs may entice people to walk through floodwaters to get to their means of transport.

A similar situation can arise with people who have parked their cars at one of the many parking stations throughout the CBD which may be remote from the building which they occupy. They too may attempt to traverse floodwaters to reach their vehicles.

b) Pedestrian Evacuation

Pedestrian evacuation would potentially be available for the areas with rising road access or overland escape routes. However for the low flood islands and high flood islands, their escape route would be cut off prior to them attempting to evacuate, unless an evacuation trigger at a lower level is used. Similarly to vehicular evacuation, an earlier trigger may be impractical as the trigger level required to allow enough time would be so low that it is frequently reached while not going on to flood many premises.

Even those areas which are mapped topographically as having rising road access or an overland escape route may become defacto flood islands by the nature of the development. For example, offices or apartments above the ground floor in buildings would be isolated by floodwaters once the ground level floods. Should occupants fail to leave the building before this occurs then they will be trapped in just the same way as people on flood islands. Whether their office acts like a low or a high flood island will depend on whether the highest accessible part of the building is below or above the PMF level respectively.

The Parramatta CBD Flood Evacuation Assessment report (Molino Stewart, 2019) identified those areas where it may be possible to exit a building onto flood free land with rising pedestrian access even if the lower part of the block may be flooding. It did this for the 20 Year ARI and 100 Year ARI floods and the PMF. For those buildings without flood free access, a potential network of elevated pedestrian walkways was investigated and costed as a means of providing flood free access.

Figure 19 and Figure 20 are taken from that report showing the areas which have street level access in the 20 Year ARI flood and PMF respectively and the directions in which evacuees need to travel.

Results show that pedestrian evacuation using elevated walkways would be faster than vehicular evacuation under existing conditions.

Interestingly, the shortest evacuation time (4.4 hours) is achieved in the PMF. This is because the PMF would require a larger network of elevated walkways (because the flood extent is larger), which would result in the CBD evacuees being distributed across a greater number of egress points. For example, in the PMF there would be eight egress points for evacuees heading towards Westfield, while in the 20 year and 100 year ARI events there would be only 4 and 5 respectively.

The challenges with relying upon pedestrian evacuation were found to be:

- Infrastructure cost would be significant and ranging from $94.5 to $324 million
- The elevated walkways would cause major visual impact and overshadowing
- Trees located along the walkway's path may need to be removed and replaced with low-level shrubs
- In events larger than the 20 year ARI, the walkways would need to be directly accessible from the upper levels of each building. This would be difficult to achieve in practice, because floor levels vary between different buildings

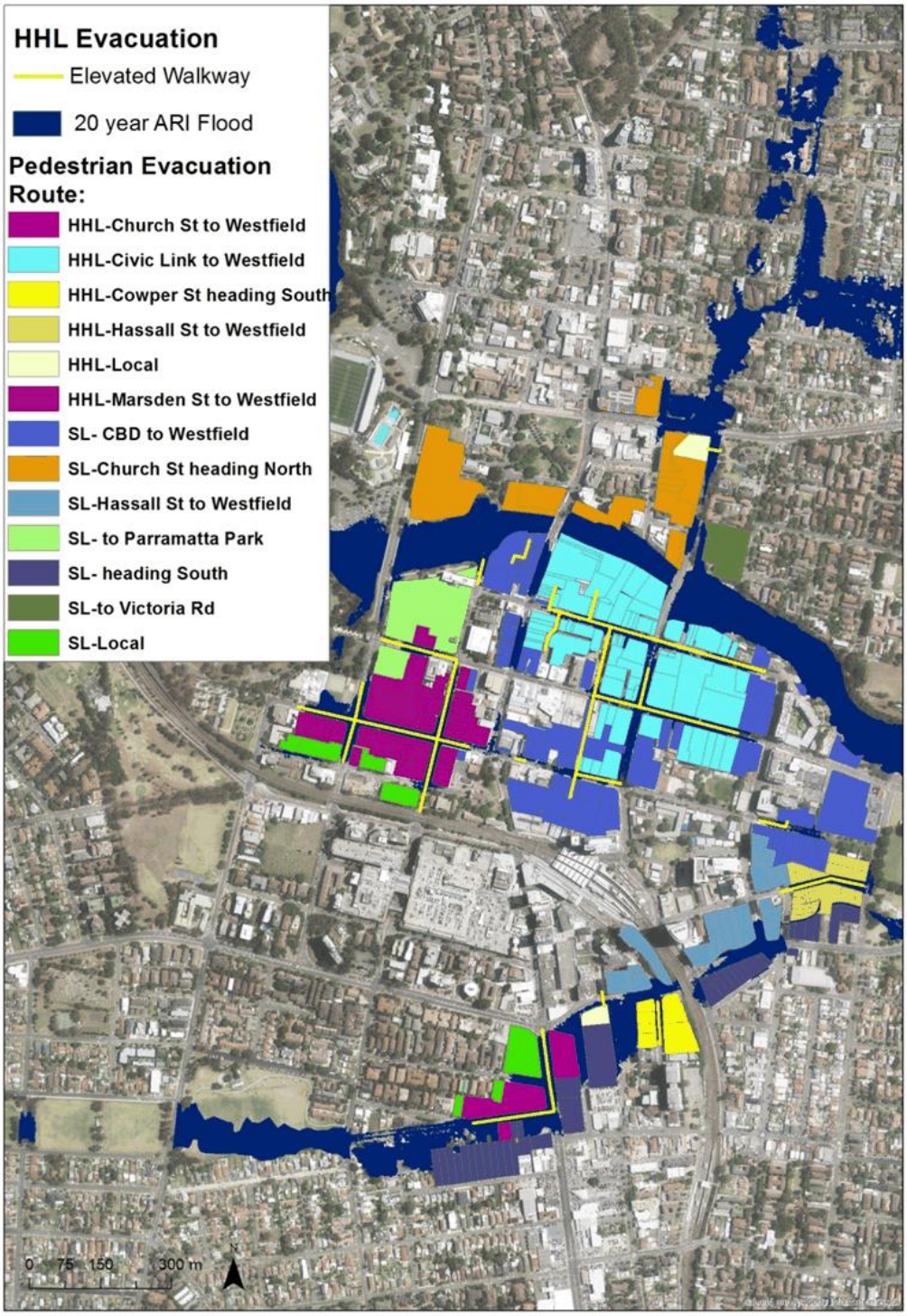

Figure 19: Pedestrian evacuation precincts evacuation routes for buildings affected by the 20 year ARI event.

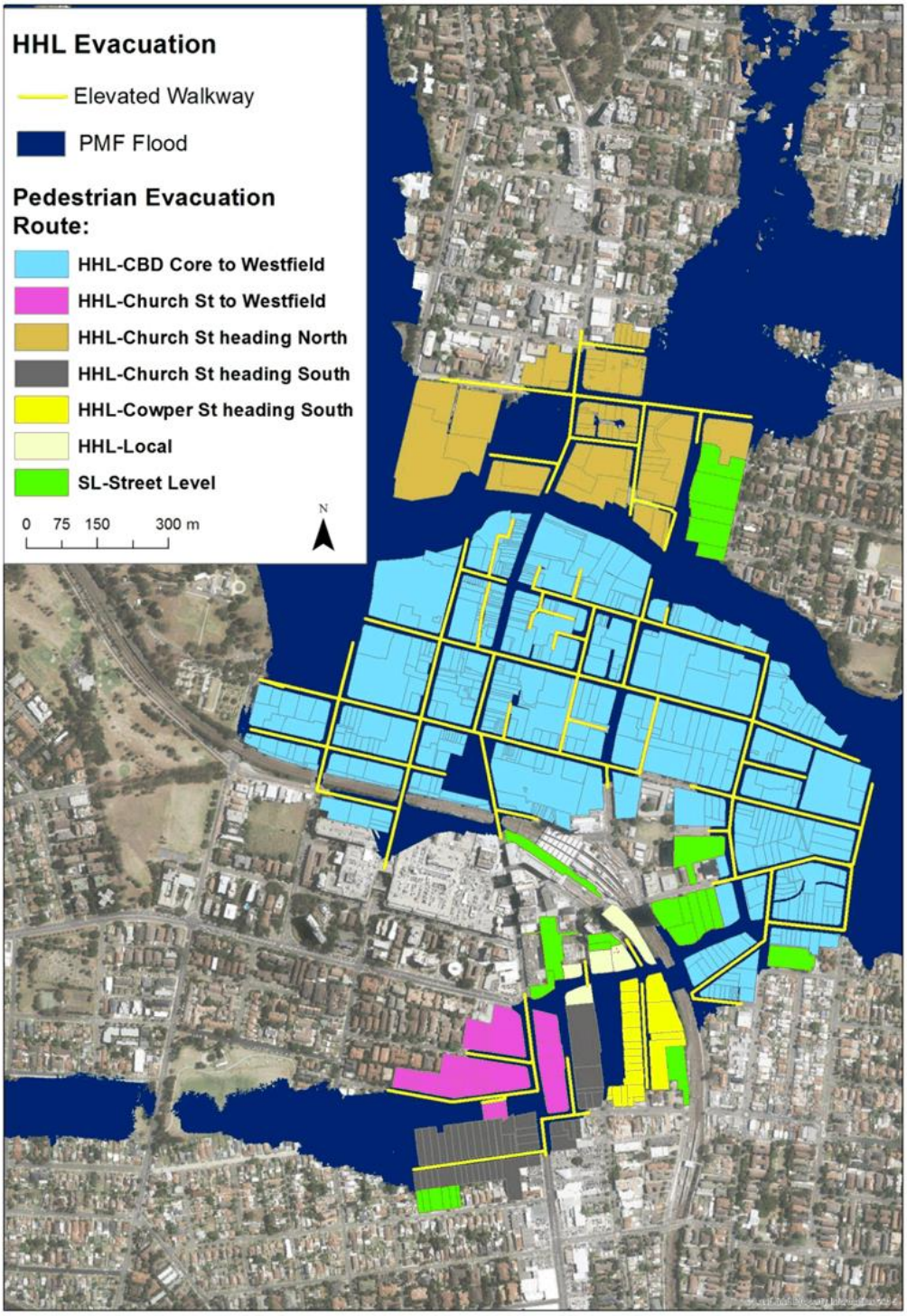

Figure 20: Pedestrian evacuation precincts evacuation routes for buildings affected by the PMF

- Where walkways traverse a road, or a crossroad, large vehicles which are taller than 4.5m would not be able to enter
- It may be a challenge communicating who should use the elevated walkways and who should evacuate at street level
- Pedestrian evacuation times range between 4 to 5 hours and the evacuation process may finish after floodwaters have already receded
- Providing an extensive network of walkways that will not be used on a daily basis, will potentially create issues with informal use and security
- Providing accessibility ramps to the walkways will impact on road layouts within the CBD.
- People will be reluctant to leave a dry building to walk through torrential rain to shelter in another dry building, particularly if they perceive that their building provides shelter above the reach of floodwaters (whether that is true or not);
- Those who arrived by light rail (when it is built) are unlikely to be able to leave by light rail because water across the tracks would stop its operation, many who arrived by bus will not be able to leave by bus because many bus routes will be cut by flooding, those who arrived by train may not be able to leave by train if flooding elsewhere or the inclement weather generally has disrupted rail services. All of these people may be reluctant to leave their buildings if they have no means of leaving Parramatta;
- Residents in particular have demonstrated an unwillingness to evacuate when orders have been given to evacuate in floods throughout Australia in recent years so it may be especially difficult to get people to leave an elevated dwelling in a high rise building on foot in torrential rain.

c) Shelter in Place

Shelter in Place is where the occupants of the building essentially stay where they are until the flood emergency is over. One of the key requirements for successful shelter in place is that all building occupants have access to an appropriate place of refuge. Typically this will be above the level of the PMF in a part of the building which will remain standing in the forces exerted on it by a PMF. Depending on the duration of the isolation and the needs of the occupants, there may need to be emergency provision of electricity, water, food and medications.

The viability of shelter-in-place will depend upon the depth and duration of the flood waters and also the stability of the building itself to flood waters. Additional risks such as the probability of fire or a medical emergency must also be considered, as well as the vulnerability of building occupants and their likely behaviour during a flash flood.

Typically, workers will want to leave the flood threatened building to be able to get home even if the flood duration is only a couple of hours. On the other hand, residents will tend to remain in their dwellings for several hours or more even if they are without services such as electricity. Residents who are outside of the floodplain when the building isolation occurs are very likely to try to reach their homes, risking travelling through hazardous floodwaters in the process.

The current Parramatta Local Emergency Management Plan (EMPLAN) is silent on either shelter in place or evacuation for floods. It is expected that when the Local Flood Sub Plan is prepared that will have more details about specific emergency response actions.

A number of other documents with respect to floodplain management acknowledge the appropriateness of Shelter in Place for flash flood environments. The Flood Preparedness Manual (Australian Emergency Manual Series, prepared by the Attorney-General's Department 1999) states that evacuation is a suitable strategy only when, by evacuating, people are not exposed to greater risks than they would by remaining where they are.

During discussions with the NSW SES for this project, it was acknowledged that flood

evacuation of Parramatta CBD would be impractical, although at the same time shelter in place was not recommended.

In December 2017 the NSW SES wrote to the then Department of Environment and Planning regarding a planning proposal for 180 George St Parramatta. While the letter was specifically responding to that planning proposal, it includes statements such as:

"Despite modifying buildings to reduce the risk, research into human behaviour during actual events has shown that in populations surrounded by a hazard there is always the chance that a person will not behave rationally and remain in place but rather place themselves at unnecessary risk. "

"…where safe evacuation is compromised by a lack of adequate infrastructure and/or warning time, the NSW SES recognises that the situation may result in it being safer for a population at risk to remain in place as long as the building in which the occupants are sheltering is structurally sound and there is sufficient accessible space available above the PMF for all occupants to shelter where adequate services are available and maintained."

"Emergency service response will likely be compromised by the hazardous nature of flash flooding in Parramatta CBD. In this area it is likely that emergency services cannot respond to assist those trapped in buildings due to the rapid onset and hazardous nature of fast flowing floodwater and limitations caused by access and transport issues."

5.5.5 Secondary Emergencies

A secondary emergency is where a non-flood related emergency, such as a building fire or medical emergency, occurs during a flood.

In many cases the flood and secondary emergency will be two unrelated events, however there is potential for floodwaters to damage the electrical system and cause fires or for occupants to use improvised lighting (candles), cooking and heating with naked flames that may also cause fires. The flood could also cause elevated stress levels in occupants that could aggravate pre-existing medical conditions leading to more medical emergencies. At the same time, larger developments are more likely to have emergency sprinkler systems for fire/smoke suppression and designated first aid officers if the building is staffed.

This makes it difficult to quantify the likely chance of a secondary emergency. However, some simple analysis shows that the likelihood is small.

Statistics were unavailable for the chance of building fires locally, however documents produced by the National Fire Protection Association (United States of America) in 2009 suggest that there is approximately a 0.3% chance of a reported (large enough to require assistance) fire in any given household per year (NFPA, 2009). This equals a 1 in 114,000 chance per day that a fire will occur in a household.

Assuming that a flood and fire are independent events, a lot that has a 1 in 100 Year ARI flood probability has roughly a 1 in 4 billion chance that both a flood and a fire would occur in a household on any given day. When the duration of flooding is less than 24 hours then the chance of a fire occurring during a flood is even smaller.

However, as explained above, flooding may increase the probability of a fire. Furthermore, in multiunit buildings a fire in one dwelling is likely to impact on neighbouring dwellings or, in the worst cases, the entire building and even possibly neighbouring buildings.

So while the probability of a fire in a building during a flood is likely to be small, the consequences, should a fire occur, could be significant.

It is also noted that many existing buildings within Parramatta have their fire exits located at ground level and these may not be able to be opened during a flood, as discussed within Section 3.2.4. Redevelopment of these lots would provide potential for this issue to be rectified.

An ambulance emergency is much more likely than a fire. There were on average 2,540 emergency responses per day in NSW during 2013/14 (NSW Ambulance, 2014). At the same time, there were approximately 7.41 million

residents within NSW. This suggests that approximately 1 in 3,000 people will need an ambulance emergency response per day. Given the population of Parramatta is much larger than this, it is likely that there will need to be an emergency response within the CBD during a flood. It should be noted that this data is likely to be significantly skewed by demographic issues, for example, elderly populations are much more likely to require an emergency response, whereas the make-up of Parramatta CBD is likely to be younger. This would particularly be the case during working hours as the vast majority of the working population would be less than 65 years old.

It is noted that the relatively new Westmead Ambulance Station has been built on flood prone land and can be isolated from both Westmead Hospital and Parramatta CBD by flooding in Toongabbie Creek.

While a secondary emergency has a relatively low chance of occurring during a flood, it is important to recognise the potential and manage the risks appropriately with planning controls.

5.6 PLANNING PROPOSAL IMPACTS

5.6.1 Increase in Population

The aim of the planning proposal is to increase the employment and resident population within the CBD. Using the Council supplied parameters, we have estimated the potential increase in population at risk due to the planning proposal.

Table 3 shows the estimated increases in the CBD population under the current planning controls and in the two FSA scenarios described in Section 5.2.4 if the CBD is fully developed. The current estimate for the number of people employed in the entire Parramatta LGA is around 137,000 (ABS 2016) and the number of people living in the suburb of Parramatta is around 26,000 (ABS 2016). Statistics are not available to determine what proportion of these populations is just within the CBD. What the numbers in Table 3 show is that even the existing controls in the CBD will still allow a significant increase in the population should it be fully developed..

It should be acknowledged, however, that the entire commercial population and the entire residential population are unlikely to be occupying the CBD at the same time. During business hours most of the residents will not be at home and when most of the residents are at home (late at night) most of the businesses will be closed.

There will also be a third population in the CBD during office hours and they are visitors who are not counted in either the commercial (jobs) or resident populations. Visitors include patrons of commercial premises, people in the CBD to do business and students at pre-schools, schools and colleges.

As part of the Parramatta CBD Flood Evacuation Assessment (Molino Stewart. 2019) the total number of residents, workers and visitors that would need to evacuate were estimated for 2016, 2036 and 2056 (Table 4). The numbers in Table 4 are not directly comparable with those in Table 3 because the former includes buildings in the Western Corridor and the latter includes buildings in the planning proposal area which do not flood.

Year 2036 was obtained by projecting 20 years into the future the number of evacuees that would be achieved under the existing planning controls, plus some site-specific planning proposals that have at least received Council endorsement to be sent for Gateway determination.

Table 3: Estimated Potential Increase in Population in Planning Proposal Area.

	Commercial	Residential
Existing	35,048	19,576
FSAR1	92,253	58,961
FSAR2	76,096	68,000

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Table 4: Estimated Potential Population in Flooded Properties in Planning Proposal Area.

	Residents	Workers	Visitors
2016	10,010	34,931	26,245
2036	32,793	63,130	45,214
2056	50,574	81,826	59,340

It has been demonstrated that neither vehicular nor pedestrian evacuation is viable as a primary flood response across most of the CBD with the current road and pedestrian infrastructure. Providing additional infrastructure for evacuation is problematic

Evacuation would only become more challenging with further development, even for the more modest increases under the current planning rules which are reflected in the 2036 numbers (Table 5).

These times assume that the evacuation routes will remain open for that whole time; which they will not. In the case of pedestrian evacuation it assumes high level walkways will be constructed for flood evacuation.

Table 5: Estimated Vehicular and Pedestrian Evacuation Times.

Year	Event (ARI)	Vehicle (hrs)	Pedestrian (hrs)
2016	20 Year	8.1	4.5
	100 Year	9.0	5.2
	PMF	10.7	4.4
2036	20 Year	8.7	7.3
	100 Year	9.4	8.9
	PMF	10.8	6.8
2056	20 Year	8.9	9.1
	100 Year	9.6	11.2
	PMF	11	7.9

5.6.2 Flood Response Categorisation

The flood emergency response classification of communities, described in Section 5.5.3, has been developed assuming that the occupants are at the ground floor. As described in Section 4.1.1, the planning proposal built form will be high rise buildings where the majority of occupants will be well above the ground level. When taking this into account, essentially all of the new buildings should be considered High Flood Islands.

The reason for this is that the occupants could potentially be unaware of the flooding until they attempt to leave the building, or at least the first sign they will have of flooding is that the ground floor is inundated and their escape route will more than likely be cut off. At the same time, there would be ample opportunity for those occupants to retreat up their stairs to a floor that is above the level of the PMF.

The effect of this change in categorisation depends on the original categorisation, for example:

- If the area was already a high flood island there is essentially no change to the categorisation
- If there was already a building with access to areas above the PMF the building was already a high flood island and the categorisation has not changed
- If the area was previously a low flood island with a building without areas above the PMF, it becomes a high flood island
- If the area was previously a low flood island with a building with areas above the PMF it was effectively a high flood island and that does not change.
- If the area previously had rising road access, or an overland escape route, from a building with areas above the PMF then it was effectively a high flood island and will remain so.
- If the area previously had rising road access, or an overland escape route, from a single storey building then it will effectively become a high flood island.

It should be noted that under the current planning controls, the same type of building (high rise) would be developed in the majority

of these areas, so the planning proposal will not effectively change the flood categorisation of the land or the buildings.

5.6.3 Population at Risk

The planning proposal would increase the potential population at risk within those areas that can flood. When the discussion in Section 5.6.2 is considered, it means that where there was a population on a low flood island that population will be increased but the building will convert the island to a high flood island. This means the population at risk will increase but the risk to each individual in the population at that site will decrease.

In all other areas the population at risk will increase but the risk to individuals in the population will either remain the same or will increase depending on whether it was already a high flood island or previously was low rise with rising road access or an overland escape route.

5.6.4 Risk Reduction Opportunities

The discussion in Section 5.6.3 is based entirely on the flood emergency response classification and a simplistic consideration of final building design and its implications for the population at risk.

It must be recognised that the flood emergency response classification is only one factor in determining flood risk and other considerations such as flood hazard, flood probability and flood duration are also very important.

For example, a building which is isolated by high hazard floodwaters for several hours in a 20 year ARI flood presents a much higher risk than were the same building to be isolated by low hazard floodwaters for less than an hour in a PMF. The planning proposal provides the opportunity to avoid intensification in areas which place people and property at the greatest risk from flooding.

Another consideration is that while an individual building on an individual block may have a particular flood exposure and flood emergency response classification, if a group of buildings or a collection of lots are considered as a whole the exposure and classification may be different.

A broad scale redefinition of floor space ratios, building heights and development controls offers the opportunity for redevelopment to be reconsidered at a precinct level rather than one development at a time and it may provide ways and means of decreasing the population in areas with the greatest flood risks or constructing buildings which collectively change their flood emergency response classification.

This is elaborated upon the in the following sections.

5.7 RISK EVALUATION

5.7.1 Risk to Property

The subject area is all currently developed with a mix of residential and commercial development. In most cases, the development would have occurred prior to the current flood planning controls. Application of current planning controls to redevelopment will result in less flood risk to property.

However, as highlighted in Section 3.2, some of the ways in which new developments have complied with existing flood planning requirements have had unintended outcomes. It will be important that the new planning proposal addresses these without increasing the potential flood risk to property.

Council is currently investigating this issue and examining ways in which the issue can be overcome

Overall it is considered that the planning proposal should be able to be implemented without increasing the flood risk to property.

5.7.2 Risk to Life

Evaluating the risk to life arising from the planning proposal is more complex. Considering the CBD as a whole it will result in more people occupying flood prone areas but in such a way that reduces the probability of them coming in contact with floodwaters inside their building.

Flood behaviour and topography varies across the CBD and an approach is needed which takes this variability into consideration. Given the impracticalities of vehicular evacuation and the challenges of pedestrian evacuation, it is our view that shelter-in-place is the most appropriate flood response for most of the buildings in the Parramatta CBD.

Having said that, it is preferable to encourage development which minimises the chance that people will be frequently isolated in buildings for long periods of time because they may:

- try to leave (or enter) the building through hazardous floodwaters despite advice to the contrary
- need medical assistance
- need to evacuate from a fire

a) Methodology

For the purposes of this project a methodology was developed which considered how frequently buildings are likely to be isolated by flooding, how long they would be isolated and how hazardous surrounding floodwaters would be to those entering or leaving the building on foot.

Table 6 summarises the methodology and criteria used for evaluating the flood risk to life.

The first criterion used was the probability of flooding. This was based on the available modelled flood extents which were limited to the 20 year ARI (5% AEP), 100 year ARI (1% AEP) and the PMF. Flooding above the 100 year ARI (<1% AEP) was considered to be rare flooding and would require minimal measures to manage risk to life. At the other end of the scale flooding more frequent than the 20 year ARI (>5%) would require the greatest controls to manage risk to life.

While flooding larger than the 1% AEP is rare, there have been several examples of major floods within Australia within the past 12 years that have exceeded the flood levels of the 1% AEP design flood, this includes;

- Flooding in King John Creek in Moreton Bay (QLD) in May 2015, which has an estimated 0.1% AEP
- Flooding in Dungog on the Myall Creek and Patterson River in April 2015, which has an estimated 0.2% AEP
- Widespread flooding in Queensland in 2011, including the Brisbane River, Pine River and Lockyer Valley, which has estimates of between the 1% and 0.1% AEP in various catchments
- Widespread flooding in northern Victoria in 2010 and 2011 which has been estimated at less frequent than the 1% AEP with a number of rivers recording 0.5% events
- The "Pasha Bulker" storm in June 2007 which flooded large areas of Newcastle, which has been estimated at much less frequent than 1% AEP.
- A localised storm at Broughton Anglican College near Campbelltown, NSW in April 2007 caused a 0.2% flood
- Rainfall in the Flinders Ranges in South Australia in January 2007 was in the order of a 0.1% event over an area the size of the Sydney Metropolitan Area

The second criterion was depth of flooding in the PMF as this represents the worst case scenario in terms of hazard to anyone trying to enter or leave the building. While hazard is traditionally determined from depth and velocity combinations, the lack of velocity information meant that for this project only depth was used. Two depth thresholds were considered and were based on the most recent Australian research in this area (McLuckie et al, 2014).

A 0.6m threshold was used to represent the depth above which it would be difficult for emergency service vehicles to reach buildings. A depth of 1.2m was used as the other threshold which is the limit at which it is difficult for adults to traverse low velocity flood waters.

Table 6: Flood Risk to Life Evaluation Methodology

Category	Probability (AEP)	PMF Depth (m)	[Depth, Duration] Operator	PMF Duration (hrs)	Flood Emergency Response Classification	Suggested Risk to Life Management Measures
1	< 1%	< 0.6		Any	Rising access	Safe to evacuate or shelter in place. No controls required.
2	< 1%	0.6 < x < 1.2	AND	< 3	Rising access	Safe to evacuate early or shelter in place in accordance with a flood emergency response plan for the building.
3	< 1%	> 1.2	OR	> 3	Rising access	Shelter in place above the PMF in accordance with FERP. Ensure space above PMF for all building occupants to shelter. Provide building fire management system to meet ABCB requirements for high rise building.
4	1%<AEP< 5%	Any		Any	Rising access	Prohibit residential development unless there is internal flood free pedestrian access to development in categories 1 or 2. Permit some types of commercial development below 1% flood level if other planning considerations can justify. Commercial areas shelter in place above the PMF in accordance with FERP or access to development in categories 1 or 2. Provide building fire management system to meet ABCB requirements for high rise building
5	< 1%	< 0.6	AND	< 3	Flood island	Shelter in place in accordance with FERP
6	< 1%	> 0.6	AND	> 3	Flood island	Shelter in place above the PMF in accordance with FERP. Have residential habitable floors above PMF level. Have access to emergency power and water. Provide building fire management system to meet ABCB requirements for high rise building. OR provide internal flood free pedestrian access to development in categories 1 or 2.
7	< 5%	> 0.6	AND	> 8	Flood island	Prohibit residential development unless it has internal flood free pedestrian access to development in categories 1 or 2. OR provide internal flood free pedestrian access to development in categories 5 or 6 AND Shelter in place above the PMF in accordance with FERP. Have residential habitable floors above PMF level. Have access to emergency power and water. Provide building fire management system to meet ABCB requirements for high rise building. Permit some types of commercial development below 1% flood level if other planning considerations can justify providing there is warning system for early evacuation and closure OR flood free pedestrian access to development in categories 1 or 2.
8	> 5%	any	OR	any	Rising access	Prohibit development in these areas unless there is internal flood free pedestrian access to development in categories 1 or 2. No habitable commercial or residential development below 1% flood. Provide building fire management system to meet ABCB requirements for high rise building.
9	> 5%	Any		Any	Flood island	Prohibit development in these areas

The third criterion was duration of PMF flooding as this will determine how long the building and its occupants are likely to be isolated. The available data only allowed us to estimate durations of three hours or less and then hourly increments above that. Given that the NSW SES assumes that it takes two hours for people to be ready to evacuate when ordered to, a threshold of three hours was used to represent a time period in which few people would try and enter or leave the building were it flooded by PMF floodwaters. It would be flooded for less time in small floods.

The next criterion was the emergency response classification with those with either rising road access or an overland escape route considered to be at less risk than those isolated on a flood island.

In combination these criteria produced nine different flood risk categories which need different types of mitigation and response measures.

This flood risk map compares to the three "flood risk" precincts which are currently used for floodplain management in the CBD.

By using all nine categories it enables a gradation of measures to manage risk to life to be used to facilitate intensification of development within the CBD and development in locations which a more simplistic categorisation of the floodplain would prohibit. It would be possible, as part of the planning process, to consolidate some of these categories based on preferred planning controls.

b) Results

Figure 21 maps the results of the nine different combinations of criteria through the planning proposal area and a discussion on recommended measures to manage risk to life in each follows.

Category 1.

It was considered that there would be negligible risk to life in areas with rising access which cannot be flooded to greater than 0.6m depth in a PMF and have less than a 1% chance of being flooded at all. This is because they have a low chance of flooding, they can evacuate on foot ahead of the floodwaters reaching the building, emergency service vehicles could reach the building through floodwaters if needed and people could walk through floodwaters to enter or leave the building if absolutely necessary.

Category 2

Were areas with rising road access to have less than a 1% chance of being flooded but could be flooded to a depth of between 0.6m and 1.2m in a PMF and be flooded for less than three hours these were assessed to have a very low flood risk. This is because they also have a low chance of flooding but might not be able to be reached by emergency vehicles at the peak of a rare flood and if people were to try and walk through the floodwaters they may be at some risk. However, the three hour maximum duration means that there is a low chance of an emergency happening in that time and a low chance of people getting impatient and trying to walk through floodwaters. A building specific flood emergency response plan (FERP) could be used to encourage occupants to evacuate early or shelter in place.

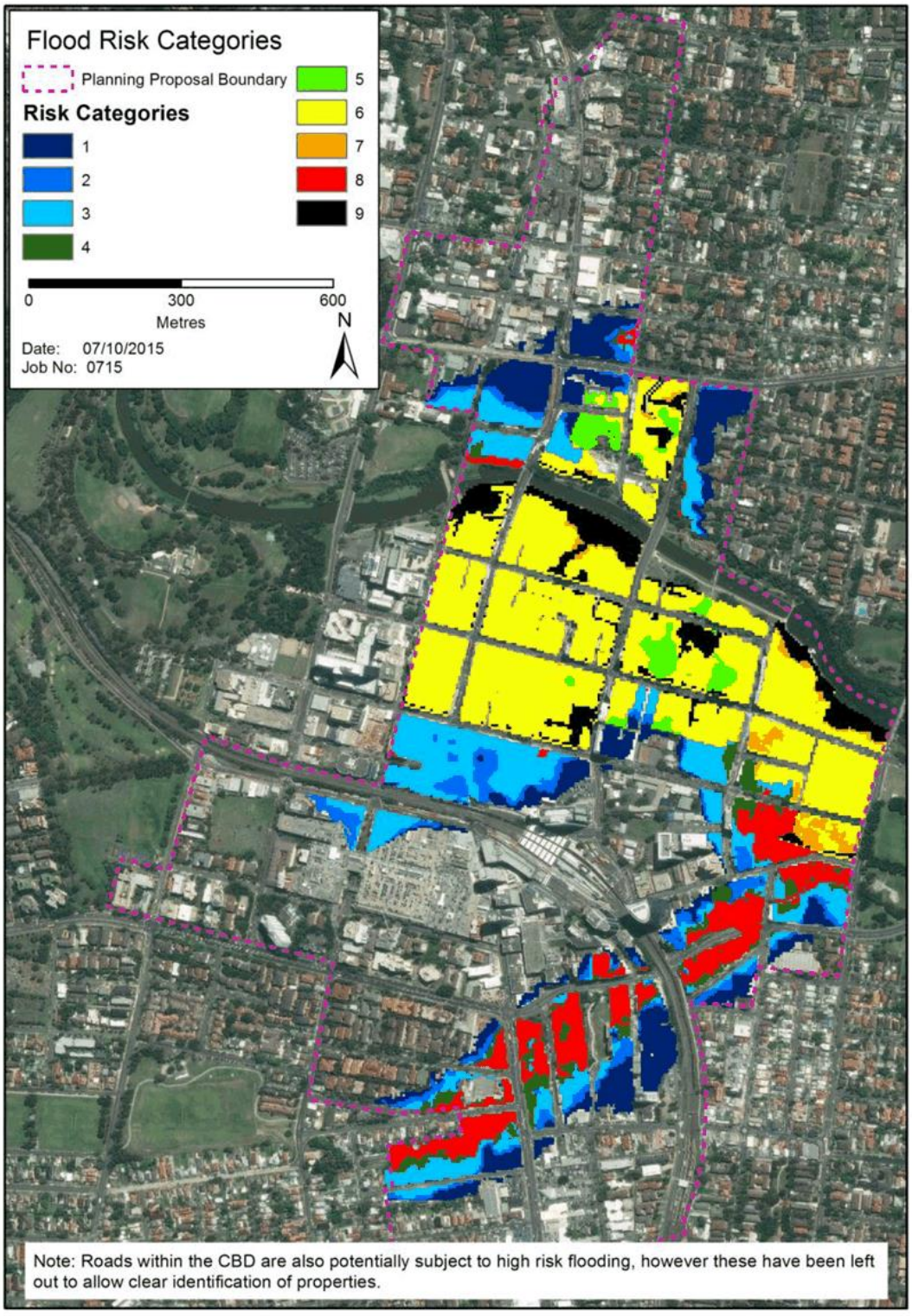

Figure 21: Flood Risk to Life Categorisation of Developable lots

Category 3.

Similar areas where the depth could exceed 1.2m or the duration could be longer than three hours were assessed to have a slightly greater risk because there is a greater chance that people may try and traverse hazardous floodwaters or emergency service cannot reach those needing assistance.

In these locations a FERP would advise people to shelter in place and a fire management system which meets Australian Building Code Board (ABCB) requirements for a high rise building could be used to minimise the chance of a fire in the building placing lives at risk. This would apply even if the building would not be defined as a high rise building (over 25 metres in effective height).

It is noted that in early 2019 the National Construction Code (NCC) was updated. The new NCC has extended the provision of fire sprinklers to lower-rise residential buildings, generally 4-8 storeys. However, non-sprinkler protection is still permitted where other fire safety measures meet the deemed minimum acceptable standard.

It would be necessary to ensure there is sufficient space above the PMF level for all building occupants to shelter.

Category 4

While areas in this category also have a rising road access, they have a much higher chance of being cut off by floodwaters and they will be flooded to greater depths and for longer durations in more extreme floods.

It is our opinion that these areas may be suitable for some commercial development (which has few occupants) below the 1% AEP flood level but above the 5% AEP flood level if there are other overriding planning considerations such as street activation. This could only be permissible if the building were designed to exclude floodwaters from high value assets within the commercial spaces below the 1% level and the commercial areas have free access to a location above the PMF within the building where occupants can shelter. Alternatively they could have internal flood free pedestrian access to development in categories 1 or 2.

Because occupants of commercial spaces may be trapped in the building for some time it would be necessary for the building to have a fire management system which meets ABCB requirements for a high rise building.

Because of the high probability of isolation it is not recommended that residential development be permitted in these areas unless it has internal flood free pedestrian access to development in categories 1 or 2.

The internal flood free access to areas with lower flood risks would mean that the occupants would be able to enter or exit the building through an entrance which has a much lower chance of being cut off by hazardous floodwaters. This access could be achieved by either a contiguous building which spans the flood risk categories or by a covered, elevated walkway connecting the building to a building in the lower flood risk area.

Access to buildings in Category 3 would not be sufficient to permit development in Category 4 areas as they have too high a probability of isolation by high hazard floodwaters and it would not be practical to provide shelter areas above the PMF in an adjacent building.

Category 5

Flood islands create higher risks because there is less of an opportunity to walk to flood free land ahead of floodwaters arriving. With this in mind if these areas have less than a 1% chance of flooding and would have less than 0.6m depth and less than three hours duration of flooding in a PMF they were assessed to have low flood risk because there would not be a significant chance that people would walk through floodwaters to leave or access the building.

However, because there is no opportunity to leave the building and walk ahead of rising flood waters it is recommended that a FERP encourage sheltering in place. No further controls are required.

Category 6

Were either the depth or duration to exceed 0.6m or three hours respectively then the area would be assessed to have a higher flood risk because the long duration increases the

chance that someone will walk through floodwaters and the greater depth increases the chance that doing so would be dangerous.

This requires a FERP which encourages sheltering in place but also the building occupants from commercial floors below the PMF must have free access to a location above the PMF within the building where they can shelter.

It is recommended that in these buildings the minimum habitable floor level of any residential dwellings be above the PMF level plus a freeboard. This should be able to be achieved by specifying that ground floor areas be for non-residential purposes and minimum ceiling heights be placed on those non-residential spaces.

There must be emergency power and water available to the building for the duration of a PMF event.

It would also be necessary for the building to have a fire management system which meets ABCB requirements for a high rise building.

Alternatively, if these buildings have internal flood free access to development in categories 1 or 2 then the controls which apply to those categories only are needed.

Category 7

Flood islands which are below the 1% flood level but above the 5% AEP flood level were all found to have flood depths greater than 0.6m and durations longer than 8 hours in the PMF and therefore present a high risk to life. However, even in these areas there are measures which can be taken to manage risk to life.

Because of the high probability of isolation it is not recommended that residential development be permitted in these areas unless it has internal flood free pedestrian access to development in categories 1 or 2.

Alternatively they can have access to development in categories 5 or 6 providing that:

- habitable floors in the residential dwellings are all above the PMF
- there is access to emergency power and water which would not be affected by the PMF
- There is a fire management system which meets ABCB requirements for a high rise building

Some commercial development below the 1% flood level but above the 5% AEP flood level may be appropriate if there are other overriding planning considerations such as street activation. This could only be permissible if the building were designed to exclude floodwaters from high value assets within the commercial spaces below the 1% AEP level and:

- There is a warning system and FERP which enables the premises to be evacuated and closed with sufficient time for occupants to reach flood free land; or
- There is internal flood free pedestrian access to development in categories 1 or 2.

Category 8

Areas with rising access which are below the 5% AEP flood level and can be flooded to more than 0.6m depth or flooded for longer than three hours were assessed to have a very high flood risk because they would flood relatively frequently and the depth or duration would increase the chance of people trying to traverse hazardous floodwaters.

All development should be prohibited in these areas unless there is internal flood free pedestrian access to development in categories 1 or 2. No habitable commercial or residential development should be permitted below the 1% AEP flood level.

Category 9

Flood islands below the 5% AEP flood level represent an extreme risk to life and habitable commercial and residential development should be prohibited in these areas.

c) Assigning a Category

Figure 21 maps the flood risk categorisation based on the assumption that there is a common access to the building at each location on the map. This will not be the reality. If a single building occupies that lot

then the risk to life which dictates the actual risk to the building occupants will be the one that applies at the entrance of the building which all of the occupants have access to.

Should a building span more than one lot, then it is again the assessed risk at the building common entrance which dictates the risk to life which the development must respond to, an example of where this would potentially be feasible is the Auto Alley area, shown in Figure 22. This provides scope for lot consolidation or building links (e.g. elevated walkways) to reduce the risk to life of a development and reduce the requirements for managing risk to life.

5.8 RATIONALISATION OF RISK CATEGORIES

While the rationale for the risk to life categories is sound and the suggested management measures in Table 6 are appropriate, the use of nine separate life risk categories in a planning scheme is not practical.

Furthermore, the fact that most, if not all, of the redevelopment which will take place in the CBD will be multi-storey, there will be little practical distinction between rising road access and flood islands because dwellings above the ground floor in an area with rising road access will effectively be on a flood island.

Finally, it was recognised that many of the suggested management measures were common across categories with additional measures required as the flood risk to life increased.

In light of these considerations, an alternative flood risk categorisation was developed and a more concise presentation of suggested life risk management measures proposed. These are summarised in Table 7 and an explanation of their rationale follows. Figure 23 is a schematic representation of the various flood emergency management control options in each of the flood risk zones.

Figure 24 shows how they are distributed across the Parramatta CBD after the number of categories were consolidated and micro risk pockets rationalised. Figure 25 has remapped the categories in Figure 24 by cadastral boundary.

For Categories 1, 2, 3 and 4, all buildings located within the PMF must be structurally sound in the full range of floods.

Category 1.

This is as per the original Category 1. In a PMF it would be subject to low hazard, short duration flooding. People would be able to walk away from rising flood waters but should they be trapped by floodwaters it would pose minimal risk to them were they to either shelter in place or choose to leave through the floodwaters.

No particular measures are needed to ensure their safety other than the building being structurally sound in the full range of floods which is not an onerous requirement given the low hazard even in the most extreme events and typical high building construction.

For Categories 2, 3 and 4, shelter in place above the PMF or evacuation to land above the PMF is required.

Category 2.

This category recognised that multistorey development in an area with rising road access is effectively the same as development on a flood island because if occupants above the ground floor fail to evacuate prior to the arrival of floodwaters they are isolated. Using this logic, the original Category 2 presents a similar risk to life as Category 6. The original Category 3 presents a slightly higher risk than these two categories.

Category 5 may appear to have similar flood hazards in the PMF as Category 1, but because it is an island and it may be necessary to traverse higher hazard water away from the site to access flood free ground, it is more logical to group this category into this new Category 2.

The proposed measures for managing life safety are those which apply to category 1 but with some additional requirements to manage the additional risks.

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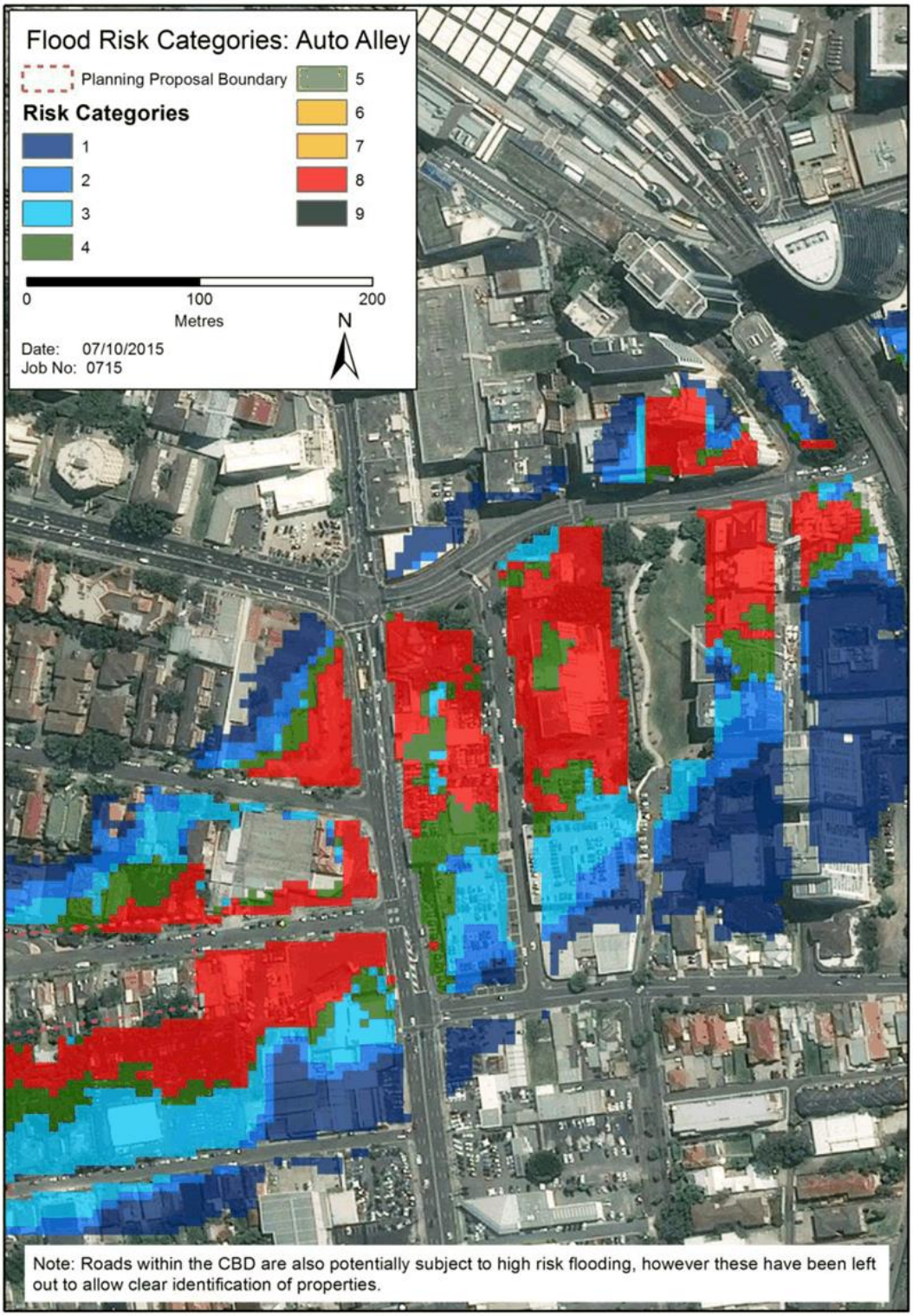

Figure 22: Flood Risk Categories around the Auto Alley Area

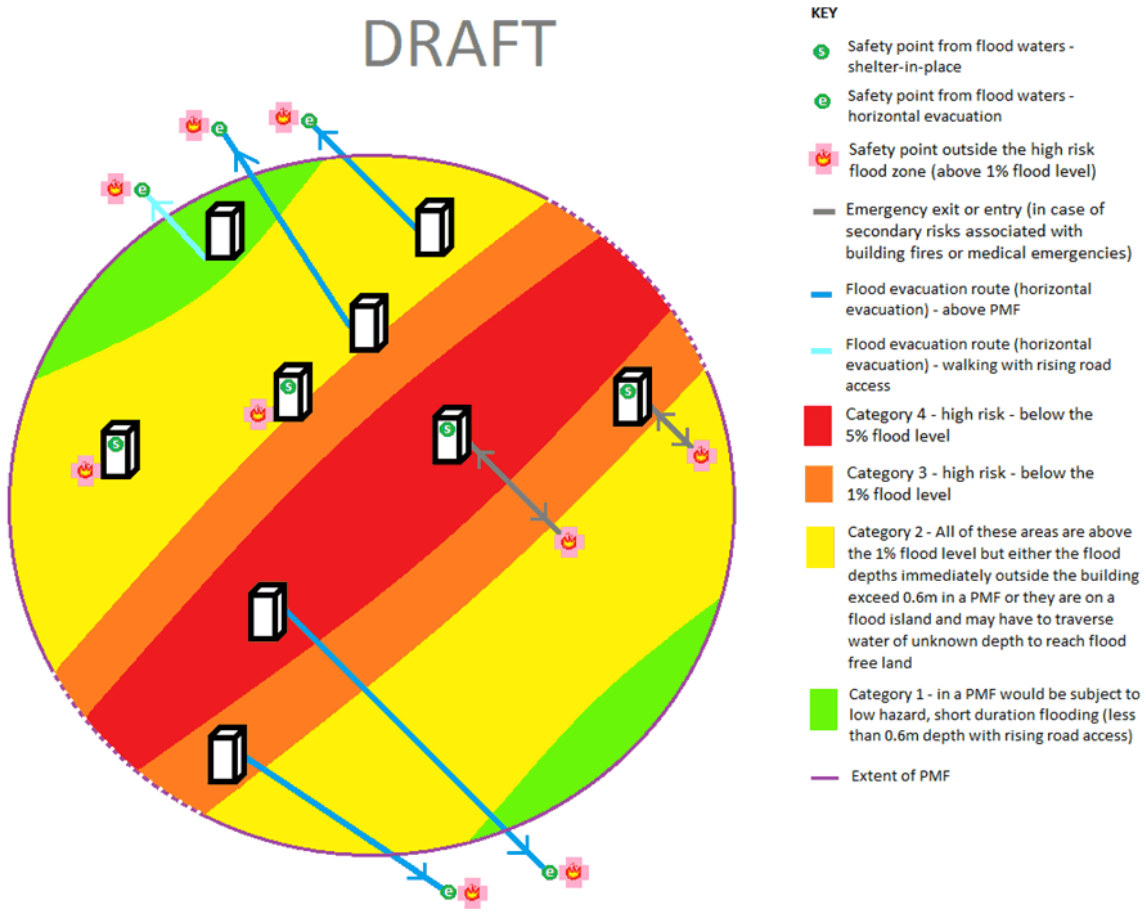

Figure 23: Schematic Diagram of Flood Emergency Response Provisions

Table 7: Concise Life Risk Categorisation and Management Table

			All buildings must do this requirement		AND	All buildings do this	OR	All buildings must do these safety requirements, if indicated by a 'Yes'				AND IF	Commercial included in the building	
Flood Type	**Old Category number**	**New category number**	Building withstand flooding to PMF	Residential floor levels above the 1% flood level plus freeboard		Flood free pedestrain access outside PMF		Shelter for all building occupants above PMF	Fire Safety to ABCB requirements for high rise whether high rise or not	Flood Emergency Response Plan for the Building Maintained by Building Owner or Body Co	Residents able to exit above 1%		Only some forms of commercial development below 1%	Temporarily occupied development only below the 1%
Low Hazard, short duration PMF	1	1	Yes	Yes										
Moderate to High Hazard PMF above 1% AEP (1 In 100 ARI)	2, 3, 5 and 6	2	Yes	Yes		Yes		Yes	Yes	Yes	Yes			
Between 1% AEP (1 in 100 ARI) and 5% AEP (1 in 20 ARI)	4 and 7	3	Yes	Yes		Yes		Yes	Yes	Yes	Yes		Yes	
Greater than 5% AEP (1 in 20 ARI)	8 and 9	4	Yes	Yes		Yes		Yes	Yes	Yes	Yes			Yes

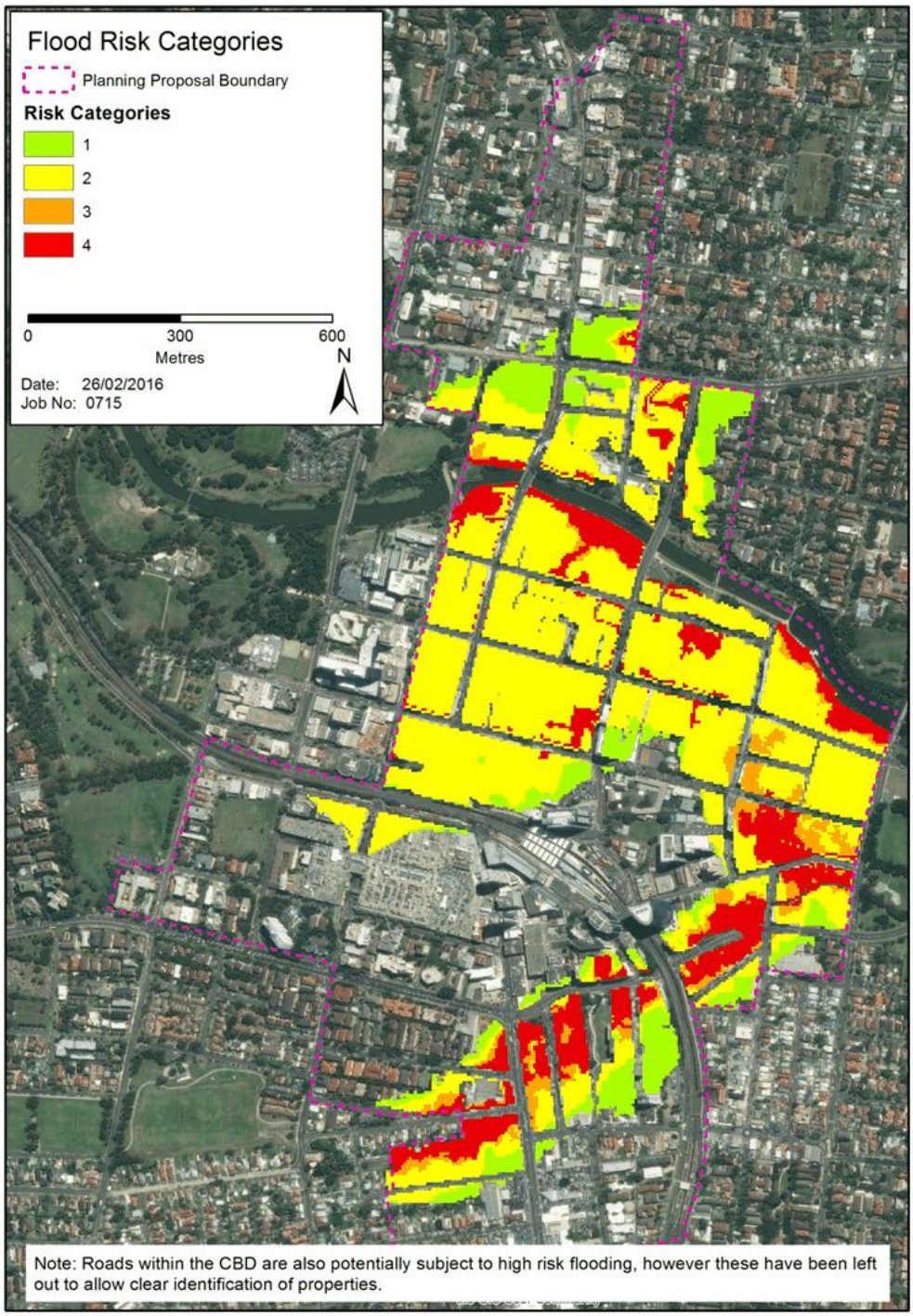

Figure 24: Rationalised Life Risk Categories Mapping

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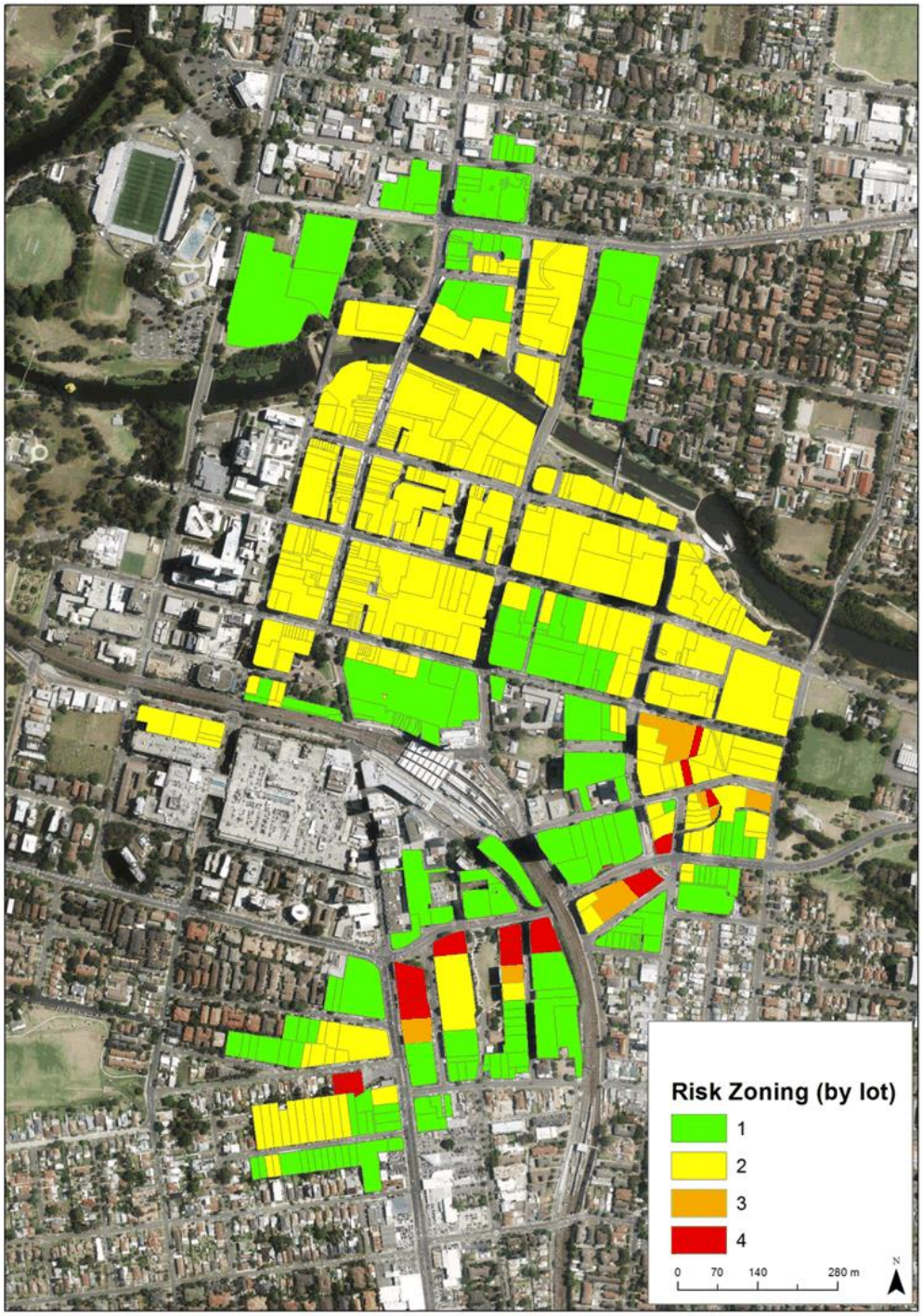

Figure 25: Rationalised Life Risk Categories Mapping by Cadastral Lot:

It is noted that all properties in this category have street frontage to a footpath which is flood free in the 1% AEP flood but they do not necessarily have a current access to a footpath above the 1% AEP flood level. It would have to be a requirement that any redevelopment of these lots has at least one access point, sufficient for fire emergency evacuation of the whole building and accessible for ingress by emergency services personnel which is above the 1% AEP flood level.

If flood free access can be provided for building occupants to an area outside the PMF, then no further controls are required. This could be achieved by having an exit from a building which is above the PMF and is accessible internally to all occupants. Alternatively, it may be achieved by providing a link to a neighbouring building, by means of internal access or a bridge, which has an exit above the PMF.

However, if that is not possible to provide flood free pedestrian access to an area outside the PMF then it would be acceptable for occupants of these buildings to shelter in place provided that:

- There are areas above the PMF sufficient for all building occupants to shelter for up to eight hours and they can be accessed by all building occupants without having to enter floodwaters A flood emergency response plan has been developed for the building and the building owner or body corporate is legally responsible for its maintenance and implementation
- Fire safety features are included within the building to meet the requirements of the ABCB for high rise buildings whether the building is high rise or not.

Category 3.

As with the groupings which make up the new Category 2, it was recognised that the old Category 4 and Category 7 had many things in common, particularly the fact that they lie below the 1% AEP flood level and therefore have a higher probability of being isolated than those in the new Category 2.

It is this particular increased probability of flooding which means that they would be required to have all of the risk management measures of the new Category 2 along with an additional control.

They must have an exit from the building above the 1% AEP flood level which is accessible to all residential occupants such that people would only be trapped inside the building by flooding greater than the 1% flood. In this way, the risk to occupants is brought into line with those in the new Category 2.

This could be achieved through internal access within the building or through a connection to a neighbouring building.

This category also recognises that some types of commercial development may be appropriate below the 1% flood level but that needs to be carefully controlled. For example if other planning considerations such as street activation make a floor level at street level preferable then this could only be permissible if the building were designed to exclude floodwaters from high value assets within the commercial spaces below the 1% level and the commercial areas have free access to a location above the PMF within the building where occupants can shelter.

Category 4.

The new Category 4 replaces the former Category 8 and Category 9. These are areas which are below the 5% AEP flood level and are therefore more frequently flooded and can experience high hazard flooding in larger events.

Occupancy of these areas poses a significant risk to life and property unless carefully controlled. Only temporarily occupied development would be permissible below the 1% flood level here.

In all other respects development in these areas must satisfy all of the controls which apply to Category 3. While at face value this might appear that these highest risk areas are not having stricter controls placed on them, the reality is that it will be more difficult for a development in these areas to meet these requirements. For example higher flow velocities may make it more difficult to construct a building which remains structurally sound within the PMF.

However, a creative design may address this and the other requirements so that a

development in these locations poses no greater risk to life than development elsewhere.

It should also be noted that the available flood data used to map the new Category 4 had less detail than that available to map the other categories. As such the boundaries of the new Category 4 may be somewhat conservative, particularly away from the main channels of the Parramatta River and Clay Cliff Creek.

However, a conservative approach has been taken with the mapping based on Council's currently adopted flood extents.

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6 MANAGEMENT OPTIONS

Table 2 summarised required floodplain management actions which have not been implemented from previous floodplain risk management plans as well as issues which council officers advised need to be addressed in a new floodplain risk management plan. In addition, management options need to be developed which appropriately manage any new flood risks which would arise due to the CBD planning proposal.

The scope of this floodplain risk management plan revision was not to undertake detailed investigation of mitigation options. It has therefore been assumed that the required unimplemented actions from the earlier plans will become part of the updated plan. Accordingly, this section focuses on options to resolve issues which relate to challenges arising from current flood planning controls or from the CBD planning proposal.

Community and stakeholder consultation for updating the Floodplain Risk Management Plan was undertaken through the Parramatta Floodplain Risk Management Committee. A committee meeting was held on 20 August 2015 and a presentation was delivered to introduce the committee to the work being undertaken, the implementation challenges with the existing flood planning controls and the risk to life issues in relation to the CBD planning proposal. This had been preceded by a presentation by City of Parramatta Council on investigations into an early flood warning system for the Parramatta River and by the NSW SES on the challenges of flood emergency response in Parramatta.

This was followed by a workshop where ideas and opinions were sought on how to deal with the issues which need to be addressed by the revised floodplain risk management plan. The following discussion has been informed in part by those workshop discussions.

6.1 WORKSHOP IDEAS

6.1.1 Evacuation

The general consensus at the workshop, including from representatives of the NSW SES, was that wholesale vehicular evacuation of Parramatta CBD as a flood response is not practical for all of the reasons given is Section 5.5.4.

It was acknowledged, however, that it is desirable for non-resident occupants to be able to evacuate safely from flooded buildings while it is more realistic to expect residents to choose to shelter within their dwellings. To this end, planning controls are needed which minimise the risk to life of both groups of building occupants.

6.1.2 Development in High Hazard Areas

It was generally accepted by the committee that there were limited opportunities to reduce the potential flood hazard. Amplifying existing channels was suggested, however after discussion it was agreed this was not feasible. The other potential solutions were generally around planning considerations, particularly:

- Using high hazard areas as shared open space
- Using planning mechanisms to encourage lot consolidation to ensure that owners of lots in high hazard areas were not financially penalised.

6.1.3 Flood Isolated Areas

The need for integrating flooding constraints into master planning for the city was stressed by members of the committee.

The committee was generally not opposed to development in flood isolated areas, so long as the following issues were addressed:

- Need to maintain a publically accessible PMF refuge
- Need to ensure services (water, electricity) are maintained

Consideration was also given to placing commercial development within higher risk areas and residential development in lower risk areas.

The concept of having elevated walkways connecting buildings in isolated areas to flood free areas was also explored at length.

6.1.4 Retail Floor Levels

The issue of having retail development disconnected from the street by stairs was discussed and it was agreed by the committee that the issue should be addressed.

A number of potential solutions were discussed, including:

- Use of elevated footpaths to bring the footpath level closer to the local flood planning level
- Having entrance colonnades, or setbacks from the street which allow ramping from the footpath level to the flood planning level inside
- Having terraced floor levels inside the ground floor of the building with flood resistant or easily moved contents on the lower levels (e.g. a restaurant may have its kitchen above the flood planning level but the tables and chairs could be lower)
- A retail space which is sealed watertight when the doors are closed

6.1.5 Other – Street Obstructions

The committee members were given an opportunity to discuss any other potential issues. The NSW SES was concerned that during a flood, there will be a number of obstacles such as street furniture, cars etc. that will impede the passage of flood rescue boats.

The issue was discussed, and potential solutions such as undertaking clear path mapping and some form of barrier to prevent vehicles from floating away were raised. However, given the general need for vehicles and street furniture through the CBD it was agreed that is unlikely that this will be easily resolved.

6.2 NSW SES LETTER

In December 2017 the NSW SES wrote to the then Department of Environment and Planning regarding a planning proposal for 180 George St Parramatta. While the letter was specifically responding to that planning proposal, Appendix 2 of the letter listed site specific design considerations and Parramatta CBD General Design considerations. Both are listed here because the site specific considerations are relevant to many sites in the Parramatta CBD, not just 180 George St.

Site specific design considerations

The site specific design considerations should be applied to this development to assist in minimising additional risk.

1. Residential development: *The habitable floors of any residential development (including aged care) should be located above the PMF with the building structurally designed for the likely flood and debris impacts.*

2. Commercial development (including retail): *To cater for the safety of potential occupants, clients and visitors in commercial development there should be the provision of sufficient readily accessible habitable areas above the PMF.*

3. Child care facilities: *Childcare facilities must be located with floor levels above the PMF level.*

4. Car parking: *Any additional parking should be above ground level and have pedestrian access to a podium level above the PMF.*

5. Making buildings as safe as possible to occupy during flood events. *Ensuring buildings are designed for the potential flood and debris loadings of the PMF so that structural failure is avoided during a flood.*

6. Limiting exposure of people to floodwaters. *This can be aided by providing sufficient readily accessible habitable areas above the PMF to cater for potential occupants, clients, visitors and residents.*

7. Provision of public accessible space for the itinerant population in areas surrounding intensive development in Parramatta CBD. *Provision of publically accessible space or access to space above*

the PMF (with adequate infrastructure to enable the physically impaired to access such space) that is easily accessible 24 hours a day for seven days a week which is clearly identified for this purpose with associated directional signage.

8. Providing adequate services so people are less likely to enter floodwaters. *This includes access to ablutions, water, power and basic first aid equipment. Consideration must be given to the availability of on-site systems to provide for power, water and sewage services for the likely flood duration (up to 12 hours) plus a further period of up to 48 hours to provide allowance for restoration of external services.*

9. Addressing secondary risks of fire and medical emergencies during floods. *Where there is no CBD wide strategy to address secondary risks during flooding. The proponent needs to consult with the relevant emergency service agency.*

Parramatta CBD general considerations

1. Sensitive development including child care: *All new emergency response hospitals, childcare and primary school facilities in Parramatta CBD should be located on land outside the extent of the PMF on land were service interruption is likely to be limited.*

2. Secondary schools and day hospitals: *Ideally new day hospitals and secondary school classrooms should also be located above the PMF level. However, at minimum there should be within a day hospital and high school building, the provision of access to adequate space above the PMF for patients, high school students, staff and visitors.*

3. Reducing human behaviour risks through businesses, schools and childcare centres. *Undertaking regular exercising of a building flood emergency response plan similar to a building fire evacuation drill.*

4. Increasing the flood awareness of current and future communities. *Council should have community awareness strategies that include requiring current and future building owners to participate in increasing this awareness.*

5. Parramatta CBD PA system. *There needs to be consideration given to developing a Parramatta CBD PA system like Sydney CBD to communicate evacuation directions and safety messages to the Parramatta CBD population in the lead up to and during a flood to assist in improving the safety of the community.*

6. Addressing secondary risks of fire and medical emergencies during floods. *To minimise the increased risk of fire and to reduce both the potential for adverse outcomes in the case of a medical emergency and the risks to those who may aid the patient, Council, DPE, NSW SES, Ambulance NSW and the relevant Health Functional area and fire agency servicing the area, should be consulted to determine appropriate risk management strategies during flooding.*

6.3 PLANNING PROVISIONS

The following recommendations take into account the results of the risk evaluation in Section 5.7 and the outcomes of the workshop summarised in Section 6.1 and the recommendations of the NSW SES in Section 6.2. Following is a discussion of recommended planning principles which be applied in the development of the planning proposal for the CBD. It includes some specific measures which should be incorporated into an update of Clause 6.3 of the Parramatta LEP and Section 2.4.2.1 of Parramatta DCP 2011 including Table 2.4.2.1.2 Floodplain Matrix. The revision of the LEP and DCP and the selection of precise wording is a detailed town planning exercise which is beyond the scope of this floodplain risk management plan revision.

It is stressed that these recommendations only relate to the DCP as it applies to the Parramatta CBD and its flood risks. They may not be appropriate for floodplains in other parts of the Parramatta LGA. The LEP provisions would also only apply to the Parramatta CBD.

The following discussion makes reference to the various planning considerations set out in the LEP and DCP.

6.3.1 Flood Risk Precincts

The current DCP divides the floodplain into three flood risk precincts: low, medium and high. However, these are generally defined by the extent of the PMF, 100 Year ARI and 20 Year ARI floods respectively with some consideration of high hazard flooding within the 100 Year ARI extent. They therefore do not so much represent flood risk but mostly flood probability which is only one contributor to risk. As discussed in Section 6.2.6, the current precinct classification results in unnecessarily onerous requirements in some circumstances and inadequate requirements in others with regard to managing risk to life.

There was already a recommendation that the definition of the flood risk precincts be reconsidered.

It is therefore recommended that consideration be given to using criteria in addition to flood probability in defining risk precincts. The method used in Section 5.8 is one approach which could be used but there may be better ways of doing this, particularly when better information is available from the new flood model. Alternatively, additional overlays could be used which define additional considerations to flood probability.

6.3.2 Unsuitable Landuse

Table 2.4.2.1.2 identifies most land uses as being unsuitable in the High Flood Risk Precinct, Critical Uses and Facilities and Sensitive Uses and Facilities as being unsuitable in the Medium Flood Risk Precinct and Sensitive Uses and Facilities being unsuitable in the Low Flood Risk Precinct.

Table 2.4.2.1.1 lists Sensitive Uses and Facilities as: community facilities or public buildings which may provide an important contribution to the flood event; child care centres; hospitals; residential care facilities; senior housing; educational establishments.

This is consistent with the recommendations of the NSW SES as set out in Section 6.2.

It does not have a category called Critical Uses and Facilities but rather Critical Utilities and Uses which includes: Hazardous industries; Hazardous storage establishments; Offensive industries; Offensive storage establishments; Liquid fuel depots; Public utility undertakings which may cause pollution of waterways during flooding, are essential to evacuation during periods of flood or if affected during flood events would unreasonably affect the ability of the community to return to normal activities after flood events; Telecommunication facilities; Waste management facilities.

As it is in the DCP the table can only identify these as being unsuitable not prohibited. Only the LEP is able to prohibit development.

Nevertheless, while there is logic in the identification of these landuses as being unsuitable in some of the flood risk precincts, there are two issues which are overlooked by the DCP.

Firstly, many sites span more than one flood risk precinct and the matrix would suggest they are suitable in one but not the other yet the higher risk precinct gets used to determine the permissibility of a particular development. Council should consider if there is a more appropriate methodology to assess this type of site.

Consideration could be given to setting some additional objective based development controls for some of these land uses.

6.3.3 Minimum Floor Levels

a) Residential

The minimum habitable floor level of residential buildings should be maintained at the 100 year ARI plus 0.5m freeboard. This is consistent with the Section 9.1 Direction. However, it is also recommended that in areas with a chance of hazardous flood depths or longer duration flooding in the PMF that residents shelter in place above the PMF. It is logical that the best place for them to do that would be in their own apartments.

It is therefore recommended that where the street entrance for a dwelling on a flood island could be flooded in a PMF for more than three hours, that the minimum floor level for the dwelling should be constructed at the level of the PMF plus a freeboard.

This would not be consistent with the Section 9.1 Direction which states:

A planning proposal must not impose flood related development controls above the residential flood planning level for residential development on land, unless a relevant planning authority provides adequate justification for those controls to the satisfaction of the Director-General (or an officer of the Department nominated by the Director-General).

Exceptional circumstances exist in Parramatta CBD which warrant flood planning controls to residential development above the residential flood planning level. In particular, there are short warning times, rapid rates of rise, and no practical means of evacuating the existing populations from the floodplain. Furthermore, the numbers of people who could be isolated by flooding will increase under the existing planning instruments. This planning proposal provides the opportunity for planning controls to be introduced so that as development takes place the risk to life for individuals is reduced.

Alternatively, the same flood risk management outcomes could be achieved by applying planning requirements for other purposes. For example, stipulating that buildings in particular areas must have commercial development on the ground floor and minimum ceiling heights. By default this will set minimum floor levels for residential dwellings which would be well above the residential flood planning level.

As these recommendations are aimed principally at reducing risk to life, it is arguable that it would be better for these particular provisions to be included in the LEP rather than the DCP. In this way they cannot be easily overridden, particularly as they are not consistent with common practice.

b) Commercial

The current requirement to have all commercial floor levels at the 100 Year ARI flood level plus freeboard fails to recognise the high variability in the nature of commercial premises and the opportunities to use areas below the 100 Year ARI with minimal flood damages. It is also resulting in developments with retail spaces which do not address the street well because they require stepping up from the footpath into the building.

It is therefore recommended that particular classes of retail development be permitted to have areas below the 100 Year ARI level if it can be demonstrated that flooding will not cause significant losses to the contents at that level. For example a restaurant may have its kitchen above the flood planning level but the tables and chairs could be set out at a lower floor level. The tables and chairs (and the floors and walls for that matter) would need to be made of flood compatible materials so that they could be cleaned and reused following a flood.

An even broader range of commercial developments may be appropriate at street levels below the 100 Year ARI if the space can be sealed water tight. We would recommend permitting any retail development with a floor level at street level providing that all of the retail space is sealed watertight when the doors are closed. Provision would have to be made to ensure that occupants can access a flood free location from within the building. There would also have to be engineering standards with which the sealing would have to comply.

It is recognised that this would be a change in direction in Parramatta Council's floodplain management principles. However, flooding is only one consideration in urban planning and design and providing that risk to life can be management appropriately and the commercial risks are outweighed by the commercial benefits, such a change may be justified.

6.3.4 Building Components and Soundness

The existing provisions within the DCP are generally satisfactory. If some retail space below the current flood planning level is permitted (see 6.2.2 b) then the current DCP requires that they be flood compatible which is appropriate. Further provisions may need to be included if it is proposed that it be permissible to dry waterproof some commercial development below the 100 year ARI flood.

6.3.5 Flood Affection

The current DCP requirements with regard to flood affectation are sound. However, the way in which some developments have complied with this requirement in terms of under building flow paths has led to some architecturally unattractive and hydraulically questionable buildings.

We would recommend that provision be included within the DCP which requires more than an engineer's report that it does not affect flooding.

6.3.6 Car Parking and Driveways

The existing provisions in the DCP in relation to car parking and driveways are designed to:

- maximise the opportunity for vehicles to evacuate from premises without driving through high hazard floodwaters
- minimise the chance of multivehicle car parks being inundated
- eliminate the risk of people being exposed to floodwaters cascading into basement carparks.

These are all laudable objectives and the provisions in the DCP are an appropriate way of achieving that.

However, if it is accepted that vehicular evacuation from the CBD, or at least those areas which are flood islands, is not a practical proposition, then a different approach is required.

For example the current DCP requirement of providing a driveway no lower than 0.2m below the 100 year ARI flood level is redundant if the access roads some distance from the building are all lower than this. What is needed in the CBD is a means of preventing vehicles from leaving the car parking areas if water has reached hazardous levels in the access roads. If this is not practical then there needs to be a means of preventing vehicles leaving the car parking areas once the water outside the carpark entrance reaches the level of the footpath.

The DCP currently uses the 100 year ARI flood to define the level of protection afforded to multiple vehicles in a car park. This is an appropriate level of protection given their relative worth compared to building contents which are afforded a similar level of protection. These provisions can be maintained.

The final provision relates to basement car parks with design principle P.14 requiring these, if there is no alternative viable parking arrangement, to be protected from the PMF. This is not to protect the vehicles but to protect people who may be in the carpark from water cascading into the carpark and putting their lives at risk. This is supported as an objective.

Additional guidance may need to be provided in the DCP as to what are acceptable solutions. For example, a car park driveway with its crest above the PMF level would be a failsafe means of ensuring a basement car park does not flood. However, there are other means of keeping floodwaters out which require less space such as flood gates or doors which are triggered by flooding or even are floated into place by rising floodwaters.

These alternatives have some chance of failure and decisions need to be made about the level of reliability which needs to be demonstrated by solutions which might be proposed.

6.3.7 Evacuation

The DCP has three requirements in relation to evacuation of residential and commercial development.

For either type of development in any of the flood risk precincts the "Applicant is to demonstrate the development is consistent with any relevant flood evacuation strategy or similar plan." This is appropriate and should be maintained as a requirement.

For residential development in any flood risk precinct and for commercial development in the medium and high flood risk precinct the requirement is "Reliable access for pedestrians and vehicles is required from the site to an area of refuge above the PMF level, either on site (e.g. second storey) or off site."

This is not consistent with the results of the analysis undertaken for this project. Table 8 compares the evacuation provisions of the current DCP with those suggested by the

analysis in Section 5.7. As previously discussed, vehicular evacuation is not required, at least in the flood island areas. Furthermore, pedestrian evacuation off site is only recommended where the assessed risk to life was negligible or very low which is at the fringes of the areas with rising access and even in the areas with low risk to life, refuge above the PMF is not essential. At the same time, the Section 5.7 method is suggesting that commercial development above the 100 year ARI level needs access to a location above the PMF where depths or velocities in the PMF are high.

Given that the areas with the lowest levels of risk to life only represent a small part of the floodplain, the simplest interim change to the DCP would be to remove reference to vehicular evacuation and make this requirement apply to all residential and commercial development.

The practical implication of this is that it will not encourage developments to have a building entrance at the location with the lowest flood risk to life and it would also not require development in the high flood risk precinct to have any additional controls over those in the low or medium risk precincts. Additional controls are needed in the DCP to encourage:

- Building entrances at a point of lowest flood risk to life on a lot
- Consolidation of lots where this will connect a lot with a higher flood risk to life with a lot with a lower flood risk to life
- Pedestrian overbridges which give developments access to lots with a lower risk to life which are on the other side of a road

It is strongly recommended that the above listed access points be flood free in at least the 1% AEP flood. This is so that emergency services have a very low probability of not being able to access the building and occupants have an extremely low probability of not being able to exit the building if another emergency arises in the building while there is flooding outside. Given that this is fundamentally about minimising risk to life there is merit in this being included in the LEP rather than the DCP so that it cannot be easily overridden.

Controls are also needed to prohibit isolated developments in the high flood risk precinct.

Redevelopment of the CBD will result in the creation of new areas of public open space or public domain areas and these and existing public spaces are likely to be used by more people, more often. Currently the DCP only requires that these areas have reliable pedestrian access during a 20 year ARI peak flood and that their development is consistent with any relevant flood evacuation strategy.

We would recommend that a flood emergency response strategy be developed for the public areas of Parramatta CBD which considers flooding up to the PMF. We also recommend that the development or redevelopment of any public open space provide pedestrian pathways of sufficient capacity for all users to be able to walk ahead of a flood rising as fast as a PMF to a location above the PMF. We recommend that these paths be continuously rising to at least above the 100 year ARI flood level and thereafter not drop below this level.

It is noted that there are large areas of publicly accessible space around Parramatta Train Station and Bus Interchange which is flood free. Furthermore, Westfield Shopping Centre is also mostly flood free and should be considered, in consultation with the centre management, as a potential place of flood refuge as part of a CBD flood emergency response plan.

Probably the best means of achieving any of these is by offering additional floor space ratio incentives to developments which do one of the above. This will essentially mean that the more people developers want to put in the floodplain, the lower they will have to make the probability that the entry to the building will be cut by hazardous floodwaters.

Table 8: Evacuation Planning Provisions

Probability (AEP)	Existing Flood Risk Precinct	DCP Evacuation requirements for residential and commercial development	Risk to Life Category	Suggested Occupant Response
< 1%	Low	3. Reliable access for pedestrians and vehicles is required from the site to an area of refuge above the PMF level, either on site (e.g. second storey) or off site (residential only) 4. Applicant is to demonstrate the development is consistent with any relevant flood evacuation strategy or similar plan	1	Safe to evacuate or shelter in place. No evacuation controls required.
			2	Safe to evacuate early or shelter in place above PMF in accordance with a flood emergency response plan for the building.
< 5%	Medium	3. Reliable access for pedestrians and vehicles is required from the site to an area of refuge above the PMF level, either on site (e.g. second storey) or off site 4. Applicant is to demonstrate the development is consistent with any relevant flood evacuation strategy or similar plan 6. Adequate flood warning is available to allow safe and orderly evacuation without increased reliance upon SES and other authorised emergency services personnel	3	Evacuate early or shelter in place above PMF in accordance with a flood emergency response plan for the building providing flood free access is available to an exit through an area above the 1% flood level.
> 5%	High	As for medium flood risk precinct but only if development qualifies as concessional development	4	Evacuate early or shelter in place above PMF in accordance with a flood emergency response plan for the building providing flood free access is available to an exit through an area above the 1% flood level.

In the case of the high flood risk precinct, development should be prohibited altogether unless all occupants have reliable access to development in the medium flood risk precinct. Alternatively developments in medium or low flood risk precincts could be permitted to have increased floor space ratios if they dedicate land in the high flood risk precinct to open space uses.

Where commercial of residential development is in the medium risk precinct, or either is permitted as concessional development in the high flood risk precinct, it is a requirement that "adequate flood warning is available to allow safe and orderly evacuation without increased reliance upon SES and other authorised emergency services personnel." This is in addition to the other requirements above, and is appropriate and should be retained.

6.3.8 Management and Design

There are currently no management and design requirements for development in the low flood risk precinct. Residential and commercial development in the medium flood risk precinct or as concessional development in the high flood risk precinct must have:

- A Site Emergency Response Flood Plan
- An area to store goods above the 100 Year ARI flood plus freeboard
- No storage of materials below the 100 year ARI flood.

These are all appropriate but concessions with regard to the latter two requirements would need to be made if commercial development were permitted below the 100 year ARI flood level by any of the means suggested in Section 6.3.2.

We would also recommend the following additional requirements for any development which has a building entry more than 0.6m below the level of the PMF:

- The building have a building fire management system to meet ABC requirements for high rise buildings
- The building management review the Site Emergency Response Flood Plan annually or following a flood exceeding a 20 year ARI event and communicate the plan to all occupants

The exact wording of the provisions would need to be developed as part of the DCP review.

This is also the most appropriate place within the DCP to introduce provisions to prevent the current practice of having fire doors which open at street level and would be at depth in a flood. We would recommend that the fire doors be at least 0.5m above the level of the 100 year ARI flood. This would encourage building design which puts the fire exit on the high side of the building but also could be achieved by having the last part of the fire exit from the building external to the building.

Additionally, we would recommend that the DCP have provisions to the effect that critical building infrastructure, such as critical electrical, sewer, water and lift infrastructure be placed above the level of the PMF. This will reduce the likelihood that power or water would be disabled during a flood and also decrease the time that the building would be unliveable following the flood. The Queensland Reconstruction Authority has recently published guidelines for resilient electrical infrastructure which includes design guidelines for flood resilient electrical infrastructure in multistorey buildings (QRA, 2019).

6.3.9 Other Considerations

a) Controls on Residential Development above the Flood Planning Level

Most of the redevelopment within the Parramatta CBD is likely to be either entirely commercial development or will be mixed use residential and commercial development.

Mixed use development is likely to have commercial development on the ground floor with residential development above it. As discussed in Section 6.3.3, this may be a way of ensuring that minimum residential floor levels are above the PMF in areas where that is appropriate for managing risk to life in a way which does not contravene the provisions of the Section 9.1 Direction without the need for the granting of exceptional circumstances.

Similarly, recommended provisions with regard to refuge above the PMF, fire management systems, emergency power and water, protection of basement car parks and provision of a building specific FERP, could all be imposed as requirements on the commercial development in such a way that they make adequate provision for the residential development.

However, our recommendation that residential development be prohibited in some locations or be conditional upon it being connected to an area of less flood risk may be incompatible with the Section 9.1 Direction.

The Section 9.1 Direction and guideline appear to say three slightly different things in relation to controls on residential development.

The Section 9.1 Direction states:

"A planning proposal must not impose flood related development controls above the residential flood planning level for residential development on land unless a relevant planning authority provides adequate justification for those controls …"

This could be interpreted to permit residential development on top of commercial development without any flood related development controls, even if the land on which the commercial development is built is below the 100 year ARI level, providing that the residential development is above the residential flood planning level.

The Guideline to which the Section 9.1 Direction refers creates more ambiguity as it states:

"Unless there are exceptional circumstances, councils should not impose flood related development controls on residential development on land with a low probability of flooding, that is, land above the residential FPL (low flood risk areas)."

This indicates that the controls cannot be applied where the land has a low probability of flooding (which is not what the Section 9.1 Direction says) but then provides to definitions of what that land is:

- Land above the residential FPL
- Low flood risk areas

The former is defined by the 100 year ARI plus 0.5 metres while the latter is usually defined, as it is in Parramatta's mapping, by the 100 year ARI. In areas which are reasonably flat, as parts of Parramatta CBD are, there can be a significant difference in the extent of the excluded area depending on which definition is used.

Given this ambiguity and the uncertainty around the ability to impose some of the controls it would be beneficial to use the arguments put forward in this report as *"adequate justification for those controls to the satisfaction of the Director-General"*.

b) Public Areas

The flood provisions in the LEP and DCP are very much focussed on managing the flood risks associated with the redevelopment of land within each city block. However, such development increases the use of public transport and increases traffic on the city streets. There is no real mechanism within the NSW planning system to manage flood risks associated with those activities.

The risk of traffic gridlock in Parramatta CBD's streets during a flood is real and, should floodwaters rise above the 100 year ARI level, occupants of those vehicles could have their lives at risk. Intensification of development in the CBD will not increase the maximum number of vehicles which could be so affected because the capacity of the streets will not increase. However, it could increase the chance of it happening because there is a higher probability that the streets would be grid locked.

Parramatta Station and the Bus Interchange are flood free but flooding will disrupt bus access and the flood producing weather is sure to disrupt trains. Intensification of CBD development will not change the probability of that occurring but it will increase the number of people affected by it. This will be people stranded in Parramatta unable to leave and those who wish to travel to Parramatta.

Both of these issues, along with the intensification of use of public domain areas, are emergency response issues which must be managed by a well-developed and resourced emergency response plan for the CBD. Such

an emergency response plan would consider flooding as one of many emergencies which need to be managed.

6.4 EMERGENCY PLANNING

Two of the actions which carry through into the updated floodplain management plan from the original floodplain management plan are:

- Update the local flood plan
- Continue developing the Parramatta River Flood early warning system

Both of these need to be informed by the analysis of life safety risks set out in this report and the recommended evacuation and shelter responses.

While it is proposed that buildings in categories 2 to 4 develop and maintain Flood Emergency Response Plans, these need to be consistent with an overarching Flood Emergency Response Plan for the CBD.

This plan would need to identify, amongst other things, which areas need to be warned and evacuated first, which are the safest evacuation routes and what are the most appropriate means of evacuation. It would also need to identify what areas should not be evacuated and what travel routes should be closed and under what circumstances that should occur.

Given the role of Parramatta as a major public transport hub, special consideration will need to be given to the role of public transport in flood emergency response.

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7 CONCLUSIONS AND RECOMMENDATIONS

7.1 CONCLUSIONS

7.1.1 CBD Planning Proposal

There are existing flooding problems within the CBD that need to be addressed and redevelopment provides opportunities to reduce the level of risk to individuals and property.

With reference to the Section 9.1 Direction, it is acknowledged that the planning proposal contains provisions that apply to the flood planning areas which:

- (6)(a) permit development in floodway areas; and
- (6)(c) permit a significant increase in the development of that land

As provided for in clause (9) of the Section 9.1 Direction, these inconsistencies are permissible if "the planning proposal is in accordance with a floodplain risk management plan prepared in accordance with the principles and guidelines of the Floodplain Development Manual 2005.

The risk assessment in this report has been carried out in line with the principles and guidelines of the Floodplain Development Manual (2005). It is our view that the planning proposal presents a tolerable flood risk to life and property if the recommendations made within this report, with regard to DCP revisions and other flood risk management measures, are implemented.

This conclusion has been made recognising that while the planning proposal increases the overall population at risk, it will also provide the opportunity to decrease the risk to that population through encouraging re-development which is more compatible with the flood risk.

This work has been undertaken using existing flood modelling information, which is currently being updated by Council through a new flood study. It is recommended that the risk to life assessments undertaken as part of this project be revisited following the completion of the flood study, or as part of a subsequent floodplain risk management study.

7.1.2 Planning Investigation Area

The Planning Investigation Area being considered for expansion of the Parramatta CBD is mostly flood free, and as such there would be almost no flooding constraints for redevelopment. The revisions to the planning controls recommended for the CBD Planning Proposal would be sufficient to manage flood risks in the Planning Investigation Area.

7.1.3 Parramatta North Urban Renewal Area

The Parramatta North Urban Renewal Area is almost completely within the Parramatta River floodplain and therefore careful consideration needs to be given to planning controls for that area. Although this report has not investigated flood risks in the Parramatta North Urban Renewal Area, it is likely that it would need similar planning controls to the Parramatta CBD up to the PMF flood extent.

7.2 RECOMMENDATIONS

It is recommended that the City of Parramatta Council adopt the Floodplain Risk Management Plan set out in Section 8 of this report. This plan:

- Carries forward matters from the current Floodplain Risk Management Plan which have not been completed
- Carries forward matters from the current Floodplain Risk Management Plan which had been investigated and not implement but warrant re-investigation in light of the CBD planning proposal
- Proposes continuing development of the flood early warning system for the Parramatta River
- Proposes the preparation of a Flood Emergency Evacuation Plan for the CBD
- Proposes seeking Ministerial Approval to amend Parramatta LEP 2011 with regard

to controls above the Flood Planning Level

- Proposes a revision of the Parramatta DCP 2011 with regard to flooding

The revision of the LEP should address specific recommendations in this report to ensure the Parramatta CBD Planning Proposal meets the section 9.1 direction and represents a tolerable risk to life and property. In particular, it is recommended that the City of Parramatta Council seek Minister Approval to impose controls for development within the Probable Maximum Flood area to enable occupants of buildings in identified areas that have particular evacuation or emergency response issues to:

(a) shelter within a building above the probable maximum flood level; or

(b) evacuate safely to land located above the probable maximum flood level.

Specific provisions should require that new buildings or significant alterations and additions to existing buildings contains either a safe area with emergency electricity and water for all occupants to take refuge in that is located above the probable maximum flood level, or flood free pedestrian access is available between the building and land that is above the probable maximum flood level; and the building is certified by an engineer to withstand the forces of floodwaters, debris and buoyancy resulting from a probable maximum flood event.

The provision of shelter above the PMF level and a building access at or above the 1% AEP flood level should be included within the LEP rather than just in the DCP to ensure that these minimum life safety measures are applied to all developments.

The revision of the DCP should address specific recommendations in this report to ensure that the Parramatta CBD Planning Proposal represents a tolerable risk to life and property. In particular it is recommended that the following amendments to the DCP provisions be made:

- Planning controls not be triggered solely by flood probabilities but other risk factors such as flood depth, velocity, hazard, rate of rise and duration in the full range of floods. This may require renaming or redefinition of the current flood risk precincts although that may be more appropriate following completion of the new flood study
- Consideration be given to permitting some types of commercial development at street level where this is below the current flood planning level, providing they are designed to minimise damage to property and risk to life
- Where the street entrance for a dwelling could be flooded in a PMF for more than three hours require safe refuge for all occupants above the level of the PMF plus a freeboard
- Where the street entrance for a dwelling could be flooded in a PMF for more than eight hours require that the minimum floor level for the dwelling be constructed above the level of the PMF plus a freeboard and have access to emergency water and power
- Additional requirements be considered with regard to flood affectation provisions to try and eliminate the construction of buildings with under building flow paths which are architecturally unattractive and/or hydraulically questionable
- Remove the requirement for buildings in the CBD to have driveways which allow safe access in a 100 year ARI flood and consider including a provision that prevents vehicles from leaving the car parking areas if water has reached hazardous levels in the access roads
- Remove requirements for vehicular evacuation
- Introduce development incentives such as increased floor space ratios to developments which provide building egress points with a lower depth of flooding in a PMF. This will encourage lot consolidation or elevated walkways to provide pedestrian connection to lower flood risk areas
- Prohibit residential and commercial habitable floors in the current high flood risk precinct unless there is a flood free pedestrian access to a building outside of the high flood risk precinct
- Introduce development incentives such as increased floor space ratios to developments which dedicate high flood risk land to open space uses as an

alternative to habitable buildings on that land

- If commercial developments are permitted at street level below the flood planning level then permit the storage of goods below the flood planning level provided they are protected from floods up to the flood planning level
- Require buildings which have their highest building egress more than 0.6m below the level of the PMF to have:
  - a building fire management system to meet ABC requirements for high rise buildings
  - The building management review the Site Emergency Response Flood Plan annually or following a flood exceeding a 20 year ARI event and communicate the plan to all occupants
- External fire doors be above the level of the 100 year ARI flood plus 0.5m
- Critical services infrastructure that could be damaged by flooding; such as electrical, lift, sewer and water are placed above the PMF.

8 UPDATED FLOODPLAIN RISK MANAGEMENT PLAN

The recommended updated floodplain risk management plan is essentially the sum of the recommended measures within Table 2 and Chapter 6. These have been amalgamated below in Table 9. The responses have been prioritised into High, Medium and Low categories. High priority has been given to measures that could be implemented immediately and would have an impact on the flood risk for the current population at risk. Medium was assigned to measures that could be implemented in the medium term and would reduce the risk of any proposed development.

Table 9: Updated Floodplain Risk Management Plan Measures

Proposed Measure	Measure Type	Priority	Source
Make revisions to the DCP as outlined within Section 6.2 and 7.2 of this report	Planning Control	Medium	Existing Plan Review
Council to develop a policy with respect to fencing and screening within floodways. Consideration should be given to the potential for blockage of the screen and effectiveness of the screen to convey water	Planning Control	Medium	Existing Plan Review
Council to consider ways in which it could be made clear that the S10.7(2) certificates do not contain all flooding information. Recommended that a guide to making the decision of purchasing S10.7(2) or S10.7(5) is included within the application form	Planning Control	Medium	Existing Plan Review
Council to consider ways in which S7.11 contributions could be made towards flood mitigation projects	Planning Control	Medium	Existing Plan Review
Council to encourage the NSW SES finalise their development of the Local Flood Sub Plan	Response Modification	High	Existing Plan Review
Council review the availability of flooding data to the public and develop a community awareness and education policy and program for ensuring the population at risk is aware of the flood risks to life and property	Response Modification	High	Existing Plan Review
Council continues developing the Flood Early Warning System for Parramatta CBD and includes a program for review and continuous improvement of the system	Response Modification	High	Existing Plan Review
Council to encourage Sydney Water to conduct a review of the maintenance program for the channel including removal of rubbish and excess vegetation	Flood Modification	Medium	Existing Plan Review

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9 REFERENCES

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MOLINO STEWART
ENVIRONMENT & NATURAL HAZARDS

10 GLOSSARY

THE AUSTRALIAN BUILDING CODES BOARD (ABCB) The organisation responsible for setting and maintaining the national construction code, which defines the minimum safety and design requirements for the construction of buildings

ANNUAL EXCEEDANCE PROBABILITY (AEP): The likelihood of a flood being exceeded in any given year. For example, a flood with an AEP of 1% or 1 in 100 has a 1 in 100 chance of being exceeded in any given year. Synonymous with

AVERAGE RECURRANCE INTERVAL (ARI): The long-term average number of years between the occurrence of a flood as big as or larger than the selected event. For example, floods with a discharge as great as or greater than the 20 year ARI flood event will occur on average once every 20 years. ARI is another way of expressing the likelihood of occurrence of a flood event.

AUSTRALIAN HEIGHT DATUM (AHD): The standard reference level used to express the relative elevation of different features. A height given in metres AHD is essentially the height above sea level.

BACKWATER: An area inundated by water from a river but outside the general flow of the river.

BANKFULL: The condition of a river when flow is so great that no river banks are exposed.

BoM: The Bureau of Meteorology is the Australian Government Agency responsible for providing weather forecasts. Its legislated responsibility includes, "the issue of warnings of gales, storms and other weather conditions likely to endanger life or property, including weather conditions likely to give rise to floods or bush fires."

CATCHMENT: The land surface area that drains into a reservoir or to a specific point in a river system.

CONTRAFLOW: Altering the normal direction of flow of traffic.

DESIGN FLOOD: A flood where the levels at all points along the river have the same chance of occurrence. It is estimated using hydrologic and hydraulic computer models.

DISCHARGE: The rate of flow of water measured in terms of volume per unit time, for example, cubic metres per second (m^3/s).

Discharge is different from the speed or velocity of flow, which is a measure of how fast the water is moving for example, metres per second (m/s).

EVACUATION: The movement of people from a place of danger to a place of relative safety, and their eventual return.

EVACUATION TRIGGER: The flood level that triggers evacuation of a particular area, usually given as the when the evacuation route is cut off by floodwaters or when the area is inundated.

FLASH FLOODING: Flooding that occurs without sufficient warning, usually from heavy local rainfall. For its flood warning purposes, the BoM defines it as flooding which occurs six hours or less from the onset of rain.

FLOOD EMERGENCY RESPONSE PLAN: A plan that sets out the actions and triggers for actions in response to a flood emergency. Usually undertaken on a development scale.

FLOOD FREE: An area that is unlikely to become inundated by flood waters even in a PMF.

FLOOD ISLAND: An area that may be inundated by floodwaters but is initially surrounded before becoming inundated.

FLOODPLAIN: That part of a river valley, adjacent to the river channel, over which a river flows in times of flood.

FLOOD PROGRESSION: The way in which the flood moves across an area.

FLOOD STORAGE: Areas within a flow path that provide critical temporary storage of waters during a flood

FLOOD STUDY: A study commissioned by a Council or Developer to determine the flood extents and levels of an area, utilising hydraulic modelling and hydrological calculations.

FLOODWAY: The area within a flow path that carries the majority of the flow and has higher hazard than the other portions of the flow path

FREEBOARD: A factor of safety that is usually expressed as a height above the designed flood level.

GEOGRAPHIC INFORMATION SYSTEM (GIS): A type of software system that is used to interrogate and undertake analysis on spatial data.

HAZARD: Flood hazard is generally defined by the depth and velocity product which is then categorised based on meaningful thresholds.

HYDROGRAPH: A graph showing the variation over time of water levels or flow.

LOCAL FLOODING: Flooding that occurs as a result of rainfall falling directly over the development.

OVERBANK FLOWS: River flows which cannot be contained within a river channel.

PEDESTRIAN EVACUATION: Evacuation by walking. Pedestrian evacuation should not be relied on as a primary means of evacuation, but may be built in to an evacuation plan as a failsafe mechanism should vehicular evacuation fail in extreme or unforeseen circumstances.

PREMISE: A building or development that is likely to be occupied by residents or employees.

PROBABLE MAXIMUM FLOOD (PMF): The largest flood likely to occur.

RISK: Flood risk is defined as the probability of the event occurring multiplied by the consequence, which can be made up of a number of factors (depth, velocity, damage, duration etc.)

RISING ROAD ACCESS: An evacuation route along a road which is constantly rising to a higher level and eventually to a level above the PMF.

RIVERINE: Of or pertaining to a river.

SECONDARY EMERGENCY: An emergency, such as a fire or medical emergency, that occurs during a flood.

SHELTER IN PLACE: A flood emergency response where the occupants of a premise remain in place until the flood has passed.

APPENDIX A– REVIEW OF EXISTING PLANS

Number	Study Area	Measure Type	Proposed Measure	Review Actions	Status	Revised Measure
1	Lower	Planning Controls	Establish a graded set of planning controls for land uses relative to flood risk that is consistent with the floodplain development manual	Reviewed the current DCP, consulted Flood Policy Review report prepared previously by Molino Stewart	This measure has been implemented, however a suggestion of the Parramatta Flood Policy Review undertaken by Molino Stewart is to consider revising the wording of the DCP which lists terms the precincts as "risk" when these are largely based "hazard" categories. However, this terminology has been adopted across a number of Council DCPs throughout NSW.	It is proposed that Council consider the wording of the DCP to better reflect the nature of the precincts
2		Planning Controls	A range of suggested changes to Parramatta REP 28	Review the Parramatta REP 28 and DCP	The legislation with respect to REP has been repealed, the recommended changes for the REP have been largely carried through the relevant clauses of the updated DCP	N/A
3		Planning Controls	Amend the LEP to provide consistent framework for more detailed controls to be provided in DCP	Reviewed the current LEP and DCP	It is understood that Parramatta LEP 2011 uses the Standard Instrument LEP and the wording is essentially dictated by the Department of Planning and Council has very limited scope to modify it. Clause 6.3 of the Parramatta LEP outlines Flood Planning and only applies to land below the 1:100 ARI flood event plus 0.5 m freeboard. The approach in this clause is not consistent with the Floodplain Development Manual which emphasises a merit based approach and consideration of floods up to the PMF. However, aspects of the DCP do consider the full range of floods The suggested amendment to the LEP are generally captured in the Parramatta DCP. However, the DCP doesn't define a scope for Council to consult with relevant agencies such as the NSW Office of Environment or the NSW State Emergency Service.	It is proposed to include a clause within the DCP along the lines of "The Council may consult with and take into consideration, any advice of the Office of Environment and Heritage, the NSW State Emergency Service and any other relevant agency, in relation to the nature of the flood hazard, the necessity and capacity to evacuate persons, and the consequence and suitability of the development." It is recommended Council consider implementing the requirement for basement car parks to be protected up to the level of the PMF and to determine whether this would be in contradiction to the standard instrument LEP
4		Planning Controls	Utilise the foreshore building line provisions within the LEP to provide greater weight to planning decisions with respect to the high flood risk precinct	Review the current LEP and location of the foreshore building line	The plan recommends matching the foreshore building line to the boundary of the high flood risk precinct. Examination of the foreshore building line does not appear to be coincident with the high flood risk precinct (particularly around George Kendall Park). This suggests that this recommendation has not been implemented. Discussion with Council officers suggests that this recommendation has been found to be unfeasible	N/A
5		Planning Controls	Amend current DCP and Policy as per recommendations found within Appendix C	Review the Appendix C of the Plan, the current DCP and Flood Policy	The policy and DCP are generally not as prescriptive as Appendix C, particularly in terms of the Information Required as part of a DA. The planning control matrix found within the DCP is similar to the recommended matrix within Appendix C of the original Plan. There is no mention of requirements with respect to fencing or screening within the DCP	Council to develop a policy with respect to fencing and screening within floodways. During our investigations a number of screens that are intended to allow flood waters to pass below the building would not be effective and would be prone to blockages.
6		Planning Controls	Notations on Section 149(2) Certificates as per UPRC FRMP	Review of current S149 certificates	There is currently an issue with respect to the S149 certificates as a copy of the S149(2) certificate will not contain flooding information. This is generally not explained to those requesting the S149(2) certificate.	Recommendation that a note should be added, or a guide for those applying for the S149 certificate to ensure that if they require flooding information that they are directed to purchase the S149(5)
7		Planning Controls	Consider specific S94 contributions for specific developments	Review the current S94 Plans	The plan suggests limited scope for S94 contributions towards mitigation measures, however, it recommends that this should be monitored for potential opportunities. The River foreshore park improvements are listed in the Civic Improvement Plan the design principles include improvements to the management of flood events.	Given the scale of the flooding problem within the CBD and also the extent of redevelopment currently occurring, it is recommended that the potential for S94 contributions for flood mitigation works is investigated further. This may require innovative and/or large scale works.
8		Property Modification	Proposed Voluntary House Raising and Voluntary House Purchase Policy	Council to advise	Council is currently operating a Voluntary House Purchase and Voluntary Housing Raising Scheme (Local Floodplain Risk Management Policy 2006)	Recommended that the Council await the outcomes of the current Flood Study prior to pursuing further voluntary house purchase of voluntary house raising.
9		Response Modification	Develop NSW SES Local Flood Plan	Check with SES	The Parramatta DISPLAN has some emphasis on flooding and is currently being updated. An SES local flood plan is currently being developed.	Given the nature and scale of the flood risks within Parramatta, it is recommended that resources are provided for the completion of the Local Flood Plan
10		Response Modification	Distribute Flood Risk Precinct Maps to flood affected lots	Check website, Council to advise	Flood Risk Precinct Maps are not readily available on the Council website and are only available through the flood enquiry application. Advice from Council is that these have not been distributed to areas that are at risk.	Council reviews the availability of flooding data to the public and to develop a policy or program for ensuring that the population at risk is aware of the flood risks to life and property.

11		Response Modification	Discussions re early warning system	Council to advise	Council is currently progressing the installation of a flood early warning system for the Parramatta CBD. The design and price of the system has been presented to the Floodplain Risk Management Committee and was approved by the Committee	Council continues the development of the Early Warning system and implements a continuous improvement and review process to ensure that the system is effective
12		Flood Modification	Ollie Webb Reserve detention basin	Council to advise	Constructed	N/A
13		Flood Modification	Thomas Reserve Box Culvert	Council to advise	Not Constructed after further feasibility investigations	N/A
14		Flood Modification	A'Becketts Creek de-snagging and removal of rubbish and veg	Council to advise	Council advises that this was likely done at the time but there is no ongoing action.	Council and Sydney Water conduct review of maintenance program for channel removal of rubbish, excess vegetation
15		Flood Modification	Duck Creek de-snagging and removal of rubbish and veg	Council to advise	Council advises that this was likely done at the time but there is no ongoing action.	As Above
16		Flood Modification	Duck River de-snagging and removal of rubbish and veg	Council to advise	Council advises that this was likely done at the time but there is no ongoing action.	As Above
17	Upper	Flood and Property Modification	Upgrade of Briens Road Culvert, 5 Voluntary Acquisitions (North Wentworthville FRMSP)	Council to advise	Complete	N/A
18		Flood and Property Modification	Bogalara Road Toongabbie – Pipe Upgrade and Augmentation	Council to advise	Complete	N/A
19		Flood and Property Modification	Oakes Road, Old Toongabbie House Raising (6 homes) and Flood Proofing (4 homes).	Council to advise	Complete – a number of properties owners did not participate	N/A
20		Flood and Property Modification	Wentworth Avenue to Burrabogee Rd, Pendle Hill Channel Formalisation, Culvert Upgrade and Construction of Drop Structure	Council to advise	Not Complete, Council is unsure of the status of this proposed work. I.e. whether it has been found to be unfeasible	Council to determine the reason that this work did not proceed
21		Flood and Property Modification	Burrabogee Rd to Barangaroo Rd, Pendle Hill – Pendle Hills Ck Floodway	Council to advise whether this has been constructed	Complete	
22		Flood and Property Modification	Edison Pde to Einstein Ave, Winston Hills Diversion of drainage around existing levee	Council to advise whether this has been constructed	Complete	
23		Flood and Property Modification	Barangaroo Rd to Fitzwilliam Rd, Pendle Hills – channel improvement and additional cell in Fitzwilliam Rd culverts	Council to advise whether this has been constructed	Complete – however no additional cell was included in the Fitzwilliam Rd culverts as it was not found to be feasible	
24		Flood and Property Modification	O'Connell, Ferris, Iron, Barney and Church St, North Parramatta – pipe upgrade and augmentation	Council to advise whether this has been constructed	Not completed – further investigations by Council and its consultant are on going	Council to continue investigating
25		Flood and Property Modification	Bellotti Avenue, Churchill Drive, Jerome Avenue, Defoe Place and Twain Street, Winston Hills— pipe upgrade and augmentation including modification of pits	Council to advise whether this has been constructed	Some works have been undertaken, others found not to be feasible	
26		Flood and Property Modification	Belmore Street transition chamber and Belmore Park, North Parramatta flood retarding basin.	Council to advise whether this has been constructed	Complete	
27		Proposed Investigation	Brickfield Creek FRMS	Check whether completed	Complete	
28		Proposed Investigation	Fletcher Cl, Old Toongabbie – Flood Wall	Council to advise whether this has been constructed	The investigation was completed and it was decided not to undertake the works	

29		Proposed Investigation	Campbell's Cash and Carry at Kleins Road and Boundary Road, Northmead — investigation into pipe augmentation or trunk drainage diversion works.	Council to advise whether this has been undertaken	The investigation was completed and the issues have been resolved through redevelopment	
30		Proposed Investigation	Scott Street, Andrews Avenue and Lamonerie Street, Pendle Hill— pipe augmentation and channel works.	Council to advise whether this has been undertaken	The investigation was completed and the issues have been resolved through redevelopment	
31		Proposed Investigation	Sherwood Street, Old Toongabbie levee (voluntary purchase completed in 1993).	Council to advise whether this has been undertaken	The investigation was completed and some works were implemented, however it was found that the levee was not required	
32		Proposed Investigation	Lister Street, Winston Hills levee extension and pump out — these works would be additional to the major diversion drain constructed in 1990 to prevent flooding from behind the existing levee.	Council to advise whether this has been undertaken	The investigation was completed and some works were implemented, however no pump was installed	
33		Planning Controls	Change REP No.28	Check App A Vol 2	This legislation has been repealed, therefore remove from the updated FRMP	
34		Planning Controls	Change Council LEPs	Check App B Vol 2	Suggests using foreshore building line as per above measure suggested in the Lower Parramatta FRMP, response as per Item 4.	
35		Planning Controls	Adopt and Implement DCPs or Policies consistent with Flood Planning Matrix and Plan	Check Appendix C	Complete	
36		Planning Controls	Review and revise existing 2(e) zonings over flood liable areas	Check LEP	2(e) zones now redundant as Parramatta LEP 2001 has been replaced, Flood Prone Land Map in New LEP appears to be updated	
37		Response Modification	Make up-to-date flood risk precinct maps readily accessible to public.	Check Council Website	Flood Prone Land Maps not available on Councils Website – obtainable through the LEP however this is difficult for members of public and not the intention of the plan	As Per Item 10
38		Response Modification	Define and map flood way limits in critical areas	Council to advise whether this has been undertaken	Council's current approach is to define hazard through mapping and it is the responsibility of the developer if a DA is submitted to determine the floodway extent. In the future the floodway extents will be defined through the new Flood Study that is currently being commissioned.	
39		Response Modification	Review and revise provisional flood risk precincts from Trust in light of access, warning time etc. considerations.	Council to advise whether this has been undertaken	Council has continued to revise flood precincts. A major revision will be undertaken as per the new Flood Study that is currently being commissioned.	
40		Response Modification	Prepare or adapt existing data to produce flood risk precinct maps for other catchments.	Review existing studies and plans	Flood study reviews or catchment management plans undertaken for Subiaco, Vineyard, Duck, Claycliff Creeks as well as Duck River and localised flooding areas, also the Parramatta Flood Study is currently being reviewed	
41		Response Modification	Collate data on local overland flooding for ready access and use.	Look over data provided, discuss with Council	This will be undertaken with the new Flood Study that is currently being commissioned	
42		Response Modification	Prepare and run an ongoing program to raise community awareness of flood risks	Council to advise whether this has been undertaken	Currently community awareness and education is only being undertaken as per the community consultation that is required under the floodplain risk management process.	Council to develop a community awareness and education program, as per Item 10
43		Response Modification	Brochure on flood-related building controls available.	MS Check Website Council to advise whether this has been undertaken	Council is currently preparing a number of brochures internally, however these are not publically available.	Recommended that the production of brochures with respect to building controls are completed alongside the recommendations outlined in Item 10

44		Response Modification	All councils to send flood notification letters to all owners of flood liable properties every 4 years.	Council to advise whether this has been undertaken	This has not been undertaken	As per Item 10
45		Response Modification	Prepare and make widely available a flood information brochure 'Facts about Flooding'.	MS Check Website Council to advise whether this has been undertaken	This has not been undertaken, however some flooding information is now available on Councils website.	As per Item 10
46		Response Modification	Prepare and make widely available a frequently asked questions brochure.	MS Check Website Council to advise whether this has been undertaken	This has not been undertaken	As per Item 10
47		Response Modification	Consider providing flood certificates or equivalent S149 certificates with comprehensive data on flood levels, ground/floor levels and the flood risk precinct.	Request S149 certificate for flood prone property	This information is available through the flood enquiry application. The form for the flood enquiry can be found online.	
48		Response Modification	Consider using proposed wording for S149(2) certificates.	Request S149 certificate for flood prone property	The S149 certificates currently have an issue as per Item 6	As per Item 6
49		Response Modification	Develop and implement a formal process for release and adoption of updated flood data estimates.	Council to advise whether this has been undertaken	This is undertaken as per the Public Exhibition process when a new Flood Study is undertaken.	

APPENDIX B– CURRENT PARRAMATTA DCP (2011) FLOOD PROVISIONS

2.4 Site Considerations

2.4.1 Views and Vistas

The topographical setting of Parramatta, located in a river basin and bounded by hills to the north and west, means that there are significant views and vistas which contribute to the sense of place for Parramatta. Preservation and, where possible, enhancement of public views to landmark and landscape features allows people to interpret and appreciate the special character of Parramatta.

View sharing between properties is also important to balance access to private views from properties.

Objectives

O.1 To preserve and enhance district and local views which reinforce and protect the City's urban form and enhance legibility.

O.2 To encourage view sharing through complementary siting of buildings, responsive design and well-positioned landscaping.

O.3 To ensure highly visible sites are designed in scale with the City's setting and encourage visual integration and connectivity between places.

Design Principles

P.1 Development is to preserve views of significant topographical features such as ridges and natural corridors, the urban skyline, landmark buildings, sites of historical significance and areas of high visibility, particularly those identified in Appendix 2 Views and Vistas. Refer also to Views and Vistas in the Harris Park Heritage Conservation Area in Part 4 and Views and View Corridors in Parramatta City Centre in section 4.3.3.4.

P.2 Buildings should reinforce the landform of the City and be designed to preserve and strengthen areas of high visibility. In some locations, this may be achieved through uniform heights and street walls as a means of delineating the public view corridor.

P.3 Landscaping of streets and parks is to reinforce public view corridors.

P.4 Building design, location and landscaping is to encourage view sharing between properties.

P.5 Views to and from the public domain are to be protected.

NOTE: For certain developments, 3 dimensional computer simulations or photo montages from selected locations may be required to demonstrate how the proposal affects the setting and views and vistas.

2.4.2 Water Management

2.4.2.1 Flooding

Flooding is a significant issue that affects existing and future development in the Parramatta Local Government Area (LGA). This Section establishes Council's approach to floodplain planning and the general flood prone land requirements relating to development control for the whole LGA. The development of Council's approach to flooding has regard to and complies with the New South Wales Government's Floodplain Development Manual (FDM 2005).

The criteria for determining applications for proposals potentially affected by flooding are structured to recognise that different controls are applicable to different land uses and levels of potential flood inundation and hazard. As a first step in the development consent process, proponents are strongly advised to consult with Council officers, particularly for proposals located in the medium and high flood risk categories.

2

Objectives

O.1 To ensure the proponents of development and the community in general are aware of the potential flood hazard and consequent risk and liability associated with the use and development of flood liable land.

O.2 To manage flood liable land in an economically, environmentally and socially sustainable manner.

O.3 To ensure that developments with high sensitivity to flood risk (eg. critical public utilities) are sited and designed to provide reliable access and minimise risk from flooding.

O.4 To allow development with a lower sensitivity to the flood hazard to be located within the floodplain, subject to appropriate design and siting controls and provided that the potential consequences that could still arise from flooding remain acceptable.

O.5 To prevent any intensification of the development and use of High Flood Risk Precinct or floodways, and wherever appropriate and feasible, allow for their conversion to natural waterway corridors.

O.6 To ensure that the proposed development does not expose existing development to increased risks associated with flooding.

O.7 To ensure building design and location address flood hazard and do not result in adverse flood impact and unreasonable impacts upon the amenity or ecology of an area.

O.8 To minimise the risk to life by ensuring the provision of appropriate access from areas affected by flooding up to extreme events.

O.9 To minimise the damage to property, including motor vehicles, arising from flooding.

O.10 To incorporate the principles of Ecologically Sustainable Development (ESD).

Design Principles

P.1 New development should not result in any increased risk to human life.

P.2 The additional economic and social costs which may arise from damage to property from flooding should not be greater than that which can reasonably be managed by the property owner, property occupants and general community.

P.3 New development should only be permitted where effective warning time and reliable access is available for the evacuation of an area potentially affected by floods to an area free of risk from flooding. Evacuation should be consistent with any relevant flood evacuation strategy where in existence.

P.4 Development should not adversely increase the potential flood affectation on other development or properties, either individually or in combination with similar developments(s) that are likely to occur within the same catchment.

P.5 New developments must make allowances for motor vehicles to be relocated to an area with substantially less risk from flooding, within an effective warning time.

P.6 New developments must provide an evacuation plan detailing procedures that would be in place for an emergency (such as warning systems, signage or evacuation drills).

P.7 Flood mitigation measures associated with new developments should not result in significant impacts upon the amenity of an area by way of unacceptable overshadowing of adjoining properties, privacy impacts (eg. by unsympathetic house raising) or by being incompatible with the streetscape or character of the locality (including heritage).

P.8 Proposals for raising structures must provide a report from a suitably qualified engineer demonstrating that the raised structure will not be at risk of failure from the forces of floodwaters.

P.9 Development is to be compatible with any relevant Floodplain Risk Management Plan, Flood Studies, or Sub-Catchment Management Plan.

P.10 Development must not divert flood waters, nor interfere with floodwater storage or the natural function of waterways.

P.11 Filling of land up to 1:100 Average Recurrence Interval (ARI) (or flood storage area if determined) is not permitted. Filling of and above 1:100 ARI up to the Probable Maximum Flood (PMF) (or in flood fringe) must not adversely impact upon flood behaviour.

P.12 New development must consider the impact of flooding resulting from local overland flooding whether it is a result of Local Drainage or Major Drainage.

P.13 Where hydraulic flood modelling is required, flow hazard categories should be identified and adequately addressed in the design of the development.

P.14 Council strongly discourages basement car parks on properties within the floodplain. Where site conditions require a basement car park on a property within the floodplain, development applications must provide a detailed hydraulic flood study and design demonstrating that the proposed basement car park has been protected from all flooding up to and including the PMF event. An adequate emergency response and evacuation plan must also be provided where basement car parks are proposed in the floodplain.

Design Controls

All proposals are to have regard to the planning matrix at Figure 2.7. The procedure to determine which design standards apply to proposed development involves:

Step 1: identify the land use category of the development from Table 2.6;

Step 2: determine which flood risk category applies to the land (refer to Catchment Management Unit of Council for the Flood Risk Precincts and relevant flood risk mapping); and

Step 3: apply the objectives and design principles as outlined in this section and then the design standards in the planning matrix at Figure 2.7 as applicable to the floodplain and land use category.

NOTE: An evacuation plan is not enough to negate compliance with all building regulations.

Additional guidelines relating to flood risk management and flood prone land are contained in Council's Local Floodplain Risk Management Policy.

Table 2.6: Land Use Category Definitions

NOTE: Refer to the Parramatta LEP 2011 for definitions of each land use.

LAND USE CATEGORIES	IDENTIFIED LAND USES
Sensitive Uses and Facilities	Community facilities or Public administration buildings which may provide an important contribution to the notification and evacuation of the community during flood events; Child care centres; Hospitals; Residential care facilities; Seniors housing; Educational establishments.
Critical Utilities and Uses	Hazardous industries; Hazardous storage establishments; Offensive industries; Offensive storage establishments; Liquid fuel depots; Public utility undertakings which may cause pollution of waterways during flooding, are essential to evacuation during periods of flood or if affected during flood events would unreasonably affect the ability of the community to return to normal activities after flood events; Telecommunication facilities; Waste management facilities.
Subdivisions	Subdivision of land which involves the creation of additional allotments.
Filling	The net importation of fill material onto a site, except where: (i) final surface levels are raised by no more than 100mm over no more than 50% of the site; or (ii) filling is no more than 800mm thick beneath a concrete building slab only. Compensatory earthworks, involving cut and fill, is not considered to be filling provided that: (i) there is no net importation of fill material onto the site; and (ii) there is no net loss of flood storage at all flood levels.
Residential	Backpackers accommodation; Bed and breakfast establishments; Boarding houses; Community facilities (other than sensitive uses and facilities); Dual occupancies; Dwelling houses; Group homes; Health consulting rooms; Home based child care; Home businesses; Hostels; Multi dwelling housing; Neighbourhood shops; Residential flat buildings; Serviced apartments; Public utility undertakings (other than critical utilities).
Commercial or Industrial	Bulky goods premises; Business Premises; Car parks; Depots; Entertainment facilities; Food and drink premises; Freight transport facilities; Funeral chapels; Funeral homes; Function centres; Hardware and building supplies; Heavy industries; Hotel accommodation; Industries; Landscape and garden supplies; Light industries; Materials recycling or recovery centres; Medical centres; Mixed use development; Office premises; Passenger transport facilities; Places of public worship; Public administration buildings (other than an essential community facility); Pubs; Recreation facilities (indoor); Registered clubs; Restricted premises; Retail Premises; Service stations; Sex services premises; Shop top housing; Tourist and visitor accommodation; Vehicle body repair workshops; Vehicle repair stations; Vehicle showrooms; Veterinary hospitals; Warehouse or distribution centres.

2

Land Use Category Definitions

LAND USE CATEGORIES	DEFINITIONS
Tourist Related Development	Advertising structures; Kiosks; Markets; Information and education facilities; Signage.
Open Space or Non-urban Uses	Animal boarding and training establishments; Boat launching ramps; Boat repair facilities; Boat sheds; Environmental facilities; Helipad; Jetty; Recreation areas and minor ancillary structures (e.g. Toilet blocks or kiosks); Recreation facilities (outdoor).
Concessional Development	Concessional development is any development or redevelopment that would normally not be permitted under this Plan, but may be permitted as a concession provided it: (i) is kept clear of any floodway; and (ii) involves an acceptably small (see below for limits) addition or alteration to an existing development that will not cause a significant increase in potential flood losses, risks or have an adverse impact on adjoining properties; or (iii) redevelopment for the purposes of substantially reducing the extent of flood affectation to the existing building; provided that such redevelopments incorporate to the fullest extent practical, design features and measures to substantially reduce the existing potential for flood losses and personal risks, and avoid any adverse impacts on adjoining properties – especially obstruction or diversion of floodwaters and loss of flood storage. In the case of residential development, The maximum size of a concessional development is: (i) a once-only addition or alteration to an existing dwelling of no more than 10% or 30m² (whichever is the lesser) of the habitable floor area which existed at the date of commencement of this Policy or Plan; or (ii) the construction of an outbuilding with a maximum floor area of 20m². In the case of other development categories, the maximum size of a concessional development is a once- only addition to existing premises of no more than 10% of the floor area which existed at the date of commencement of this Policy or Plan.

Table 2.7: FLOODPLAIN MATRIX

Planning & Development Controls

Flood Risk Precincts (FRP's)

Planning Consideration	Low Flood Risk									Medium Flood Risk										High Flood Risk									
	Sensitive Uses & Facilities	Critical Uses & Facilities	Subdivision	Filling	Residential*	Commercial & Industrial	Tourist Related Development	Open Space & Non-Urban	Concessional Development	Sensitive Uses & Facilities	Critical Uses & Facilities	Subdivision	Filling	Residential*	Commercial & Industrial	Tourist Related Development	Open Space & Non-Urban	Concessional Development	Sensitive Uses & Facilities	Critical Uses & Facilities	Subdivision	Filling	Residential*	Commercial & Industrial	Tourist Related Development	Open Space & Non-Urban	Concessional Development
Floor Level		3			2, 5	2, 5	2, 5							2, 5	2, 5	2, 5	1, 5	4, 5									1, 5	4, 5
Building Components		2												1	1	1	1	1					1	1	1	1	1
Structural Soundness		2												1	1	1	1	1					1	1	1	1	1
Flood Affectation		2	2	1	2	2	2					1		1	1	1	2	1					1	1	1		1
Car Parking & Driveway Access		1, 3, 5, 6			1, 3, 5, 6	1, 3, 5, 6	1, 3, 5, 6	2, 4, 6, 7						1, 3, 5, 6, 7	1, 3, 5, 6, 7	1, 3, 5, 6, 7	2, 4, 6, 7	1, 5					2, 4, 6, 7	1, 5		
Evacuation		2, 4, 6	5		3, 4	4	4					5, 3, 4		3, 4, 6	3, 4, 6	3, 4, 6	1, 4	3, 6					1, 4	3, 4 6			
Management & Design		2, 3, 4	1									1		2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4					2, 3, 4	2, 3, 4			

Not Relevant Unsuitable Land Use * For redevelopment of an existing dwelling refer also to ' Concessional Development' provisions

i. Freeboard equals an additional height of 500mm.

ii. The Parramatta LEP 2011 identifies development permissible with consent in various zones. Notwithstanding, constraints specific to individual sites may preclude Council granting consent for certain forms of development on all or part of a site. The above matrix identifies where flood risks are likely to determine where certain development types will be considered "unsuitable" due to flood related risks.

iii. Filling of the site, where acceptable to Council, may change the FRP considered to determine the controls applied in the circumstances of individual applications.

iv. Any fencing that forms part of a proposed development is subject to the relevant Flood Effects and Structural Soundness planning considerations of the applicable land use category.

v. Development within the floodplain may be subject to Clause 6.7 Foreshore Building Line in the Parramatta LEP 2011.

Floor Level	
1	All floor levels to be equal to or greater than the 20 year Average Recurrence Interval (ARI) flood level plus freeboard
2	Habitable floor levels to be equal to or greater than the 100 year ARI flood level plus freeboard.
3	All floor levels to be equal to or greater than the Probable Maximum Flood (PMF) level plus freeboard
4	Floor levels to be equal to or greater than the 100 year ARI flood level plus freeboard. Where this is not practical due to compatibility with the height of adjacent buildings, or compatibility with the floor level of existing buildings, or the need for access for persons with disabilities, a lower floor level may be considered. In these circumstances, the floor level is to be as high as practical, and, when undertaking alternations or additions, no lower than the existing floor level.
5	A restriction is to be placed on the title of the land, pursuant to S.88B of the Conveyancing Act, where the lowest habitable floor area is elevated more than 1.5m above finished ground level, confirming that the subfloor space is not to be enclosed.
Building Components & Method	
1	All structures to have flood compatible building components below the 100 year ARI flood level plus freeboard.
2	All structures to have flood compatible building components below the PMF.
Structural Soundness	
1	An engineers report is required to certify that the structure can withstand the forces of floodwater, debris and buoyancy up to and including a 100 year ARI flood level plus freeboard.
2	An engineers report is required to certify that the structure can withstand the forces of floodwater, debris and buoyancy up to and including a PMF level.
Flood Affectation	
1	An engineers report is required to certify that the development will not increase flood affectation eleswhere, having regard to: (i) loss of flood storage; (ii) changes in flood levels, flows and velocities caused by alterations to flood flows; and (iii) the cumulate impact of multiple potential developments in the vicinity.
2	The impact of the development on flooding elsewhere to be considered having regard to the three factors listed in consideration 1 above.
Car Parking and Driveway Access	
1	The minimum surface level of open spaces or carports shall be as high as practical, but no lower than 0.1m below the 100 year ARI flood level. In the case of garages, the minimum surface level shall be as high as practical, but no lower than the 100 year ARI flood level.
2	The minimum surface level of open parking spaces or carports shall be as high as practical, but no lower than 0.3m above the 20 year ARI flood level.
3	Garages capable of accommodating more than 3 motor vehicles on land zones for urban purposes, or enclosed car parking, must be protected from inundation by floods equal to or greater than the 100 year ARI flood. Ramp levels to be no lower than 0.5m above the 100 year ARI flood level.
4	The driveway providing access between the road and parking spaces shall be as high as practical and generally rising in the egress direction.
5	The level of the driveway providing access between the road and parking spaces shall be no lower than 0.2m below the 100 year ARI flood level.
6	Enclosed car parking and car parking areas accommodating more than 3 vehicles, with a floor below the 100 year ARI flood level, shall have adequate warning systems, signage, exits and evacuation routes.
7	Restraints or vehicle barriers to be provided to prevent floating vehicles leaving a site during a 100 year ARI flood.
Evacuation	
1	Reliable access for pedestrians required during a 20 year ARI peak flood.
2	Reliable access for pedestrians and vehicles required to a publicly accessible location during the PMF peak flood.
3	Reliable access for pedestrians and vehicles is required from the site to an area of refuge above the PMF level, either on site (eg. second storey) or off site.
4	Applicant is to demonstrate the development is consistent with any relevant flood evacuation strategy or similar plan.
5	Applicant is to demonstrate that evacuation in accordance with the requirements of this DCP is available for the potential development resulting from the subdivision.
6	Adequate flood warning is available to allow safe and orderly evacuation without increased reliance upon SES or other authorised emergency services personnel.
Management and Design	
1	Applicant is to demonstrate that potential development as a consequence of a subdivision proposal can be undertaken in accordance with this the relevant FRMS and FRMP
2	Site Emergency Response Flood plan required where the site is affected by the 100 year ARI flood level, (except for single dwelling-houses).
3	Applicant is to demonstrate that area is available to store goods above the 100 year flood level plus freeboard.
4	No storage of materials below the 100 year ARI flood level.

Further Information

Flood Risk Management Plan, Flood Studies, Sub-Catchment Management Plans, and Local Floodplain Risk Management Policy available from Council.

NSW Government's Floodplain Development Manual 2005 – *www.dnr.nsw.gov.au/floodplains/manual.shtml*

Parramatta City Council's Local Floodplain Risk Management Policy, 2006.

2.4.2.2 Protection of Waterways

Objective

O.1 To ensure development contributes to the protection and rehabilitation of waterways in order to improve waterway health and to develop and maintain ecologically sustainable waterways.

Design Principles

P.1 Development is to make provision for buffer areas for the preservation and maintenance of floodway, riparian corridors and habitat protection. Refer to Clause 6.7 Foreshore Building Line and Clause 6.5 Water Protection in the Parramatta LEP 2011.

P.2 Development on land subject to Clause 6.5 Water Protection in the Parramatta LEP 2011 or that abuts a waterway is to be landscaped with local indigenous species, to protect bushland and wildlife corridors and soften the nterface between the natural landscape and the urban environment. Riparian vegetation also plays an important role in stabilising bed and banks and attenuating flood flows.

P.3 The piping, enclosing or artificial channelling of natural watercourses and drainage channels is not permitted. Consideration is to be given to re-opening piped or lined drainage systems wherever feasible.

P.4 Development is to ensure that natural channel design principles are incorporated in any works on or in waterways. Refer to Figure 2.8.

P.5 Ongoing maintenance costs are to be considered in the design of any waterway protection features.

Further Information

Brisbane City Council 2000, *Natural Channel Design Guidelines*

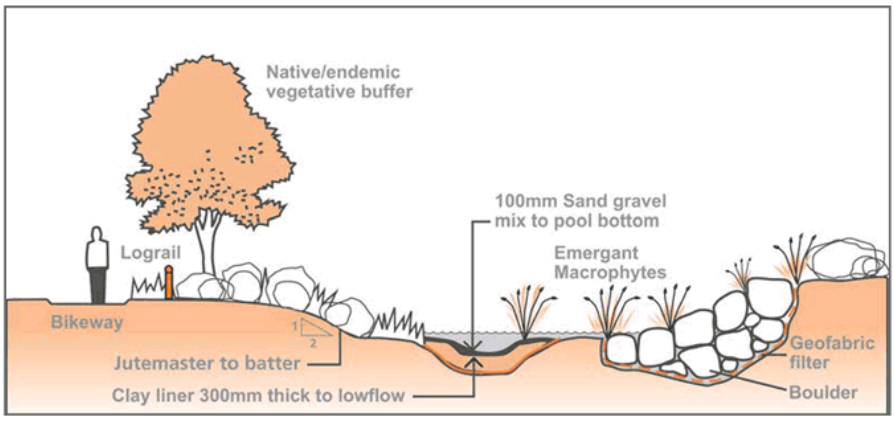


Figure 2.8 Elements of the Natural Drainage System
Sources: Stormwater outlets in parks and waterways (Brisbane City Council, 2001)

2.4.2.3 Protection of Groundwater

Objective

O.1 To protect groundwater quality, flows and drainage patterns during demolition, construction and ongoing operation phases of a development.

Design Principles

P.1 Operating practices and technology including dewatering shall not contaminate groundwater or adversely impact on adjoining properties and infrastructure.

P.2 Groundwater is to be recharged where possible while still protecting and/or enhancing groundwater quality.

P.3 Protection measures for groundwater are to be proportional to the risk the development poses. Where the potential risk to groundwater is high, a separate Groundwater Impact and Management Report will be required.

NOTE: The potential risk to groundwater is high when construction involving excavation is below the water table and is within alluvial areas and sandstone environments.

2.4.3 Soil Management

2.4.3.1 Sedimentation

Objectives

O.1 To ensure through effective site controls during and after demolition and construction, that development does not contribute to sedimentation of waterways and drainage systems, or cause wind blown soil loss.

O.2 To ensure that development does not result in environmental damage of waterways and bushland in the City.

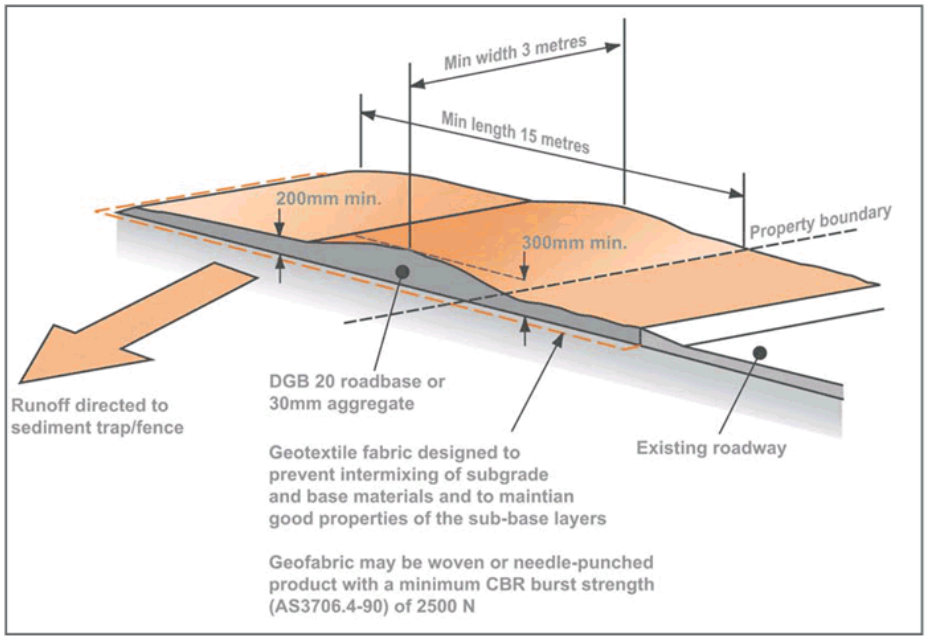


Figure 2.9 Stabilised Site Access
Source: Soils and Construction: Managing Urban Stormwater, Landcom, March 2004.

PLANNING PROPOSAL

ITEM NUMBER	6.3
SUBJECT	Gateway Request - Planning Proposal for land at 53-61 Rawson St, Epping
REFERENCE	RZ/3/2023 -
APPLICANT/S	Mecone
OWNERS	Canjs Pty Ltd
REPORT OF	Project Officer Land Use

PURPOSE

To seek the Local Planning Panel's (LPP) advice on a Planning Proposal and draft Site Specific Development Control Plan (SSDCP) for land at 53-61 Rawson Street, Epping for the purposes of seeking a Gateway Determination from the Department of Planning, Housing and Infrastructure (DPHI).

RECOMMENDATION

The Local Planning Panel consider the following Council Officer's recommendation in its advice to Council:

a) That Council approve for the purposes of seeking a Gateway Determination from the Department of Planning, Housing and Infrastructure (DPHI), the Planning Proposal for land at 53-61 Rawson Street, Epping (**Attachment 1**) which seeks to amend the Parramatta Local Environmental Plan 2023 (PLEP 2023) in relation to the subject site by:

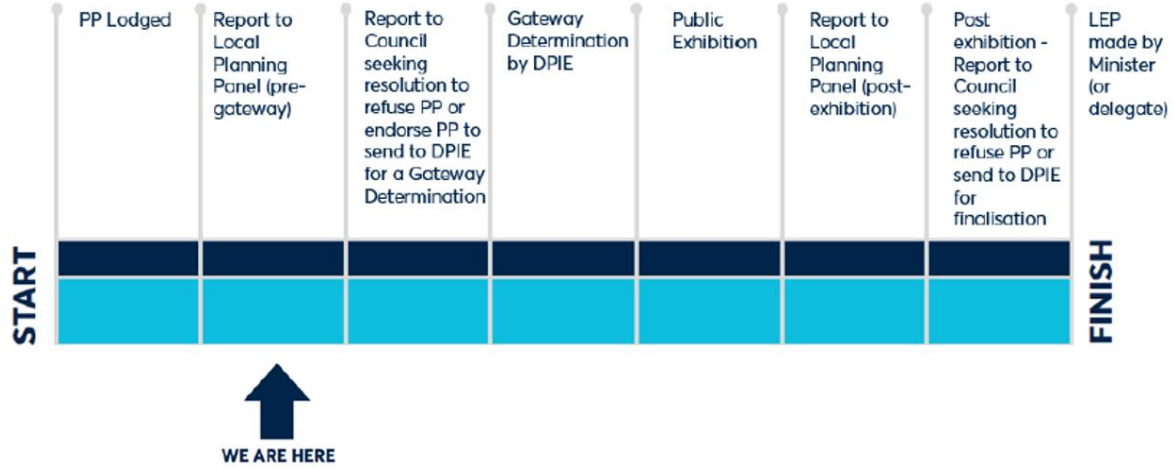
   i. Introducing an additional local provision to allow an additional Floor Space Ratio (FSR) of 1.5:1 for commercial premises only (proposed mapping provided at **Attachment 2**).
   ii. Amending the height of buildings control from 48m (15 storeys) to part 103m RL (22m or 5 storeys), part 197m RL (112m or 33 storeys) and part 206m RL (122m or 36 storeys) (proposed mapping provided at **Attachment 2)**.

b) That Council request the DPHI to provide Council with the authorisation to exercise its plan-making delegations for this Planning Proposal.

c) That Council authorise the CEO:
   i. To amend the Parramatta Development Control Plan (PDCP) in accordance with the draft Site-Specific Development Control Plan (SSDCP) (**Attachment 3**) to align with the Planning Proposal and to address the matters described in this report; and
   ii. If a Gateway Determination is issued by DPHI, to place the draft SSDCP on public exhibition concurrently with the Planning Proposal.

d) That Council authorise the CEO to correct any minor anomalies of a non-policy and administrative nature that may arise during the plan-making process and finalisation of the documents.

PLANNING PROPOSAL TIMELINE



SUMMARY

1. This report seeks the advice of the LPP on a Planning Proposal and draft SSDCP for land at 53-61 Rawson Street, Epping for the purposes of seeking a Gateway Determination from DPHI.

2. The role of the Epping Town Centre as a key commercial centre in accordance with the Parramatta Local Strategic Planning Statement has been significantly impacted by the introduction of extensive areas of high density residential redevelopment in recent years (as a result of planning controls introduced by the State Government in 2014) but very limited new commercial development. The Planning Proposal seeks to amend the PLEP 2023 to accommodate additional commercial uses by:

    i. Introducing a local provision to allow an additional 1.5:1 FSR for commercial premises only, in addition to the current FSR of 4.5:1 (total 6:1 FSR permitted) (**Attachment 2**).
    ii. Increasing the height of buildings control from 48m (15 storeys) to 122m (36 storeys) (**Attachment 2**).

3. The existing 4.5:1 FSR can accommodate a range of uses in the E1 Local Centre zone pursuant to the PLEP 2023, encouraging retail, business and community uses with some residential that contributes to a vibrant and active centre. The proposed additional 1.5:1 FSR can only be utilised for commercial premises (comprising business, office, or retail uses), which is consistent with Council's strategies by seeking to increase commercial offerings within the Epping Town Centre. The additional 1.5:1 commercial FSR will generate approximately 311 additional jobs in the area.

4. The proposed increase in building height from 48m (15 storeys) to 122m (36 storeys) is to accommodate a proposed two tower scheme comprising 33 and 36 storey towers with 4-5 storey podium inclusive of the proposed commercial FSR (**Figure 1**).

5. While a four-tower scheme would be necessary to accommodate the existing 4.5:1 FSR that's permissible whilst complying with height and PDCP controls, flooding constraints make it unlikely that a compliant scheme can be realised. Therefore, the proposed two tower scheme is recommended as the preferred option (indicative architectural drawings provided at **Attachment 4**) so that the proposed 1.5:1 commercial only FSR and the existing 4.5:1 FSR can be accommodated. The two tower scheme will not result in adverse overshadowing to Boronia Park and adjoining land, will decrease the perception of bulk and scale, and will provide improved views to sky between and around towers.

6. The draft SSDCP (**Attachment 3**) provides controls to accommodate the proposed two tower scheme (**Attachment 4**) that is consistent with the proposed amendments to PLEP 2023.

7. The western portion of the site is flood affected, however the extent of flood risk to the rest of the site and to the Epping Town Centre as a whole is low. Flood specific SSDCP controls are recommended that will ensure flood risk is mitigated at DA stage.

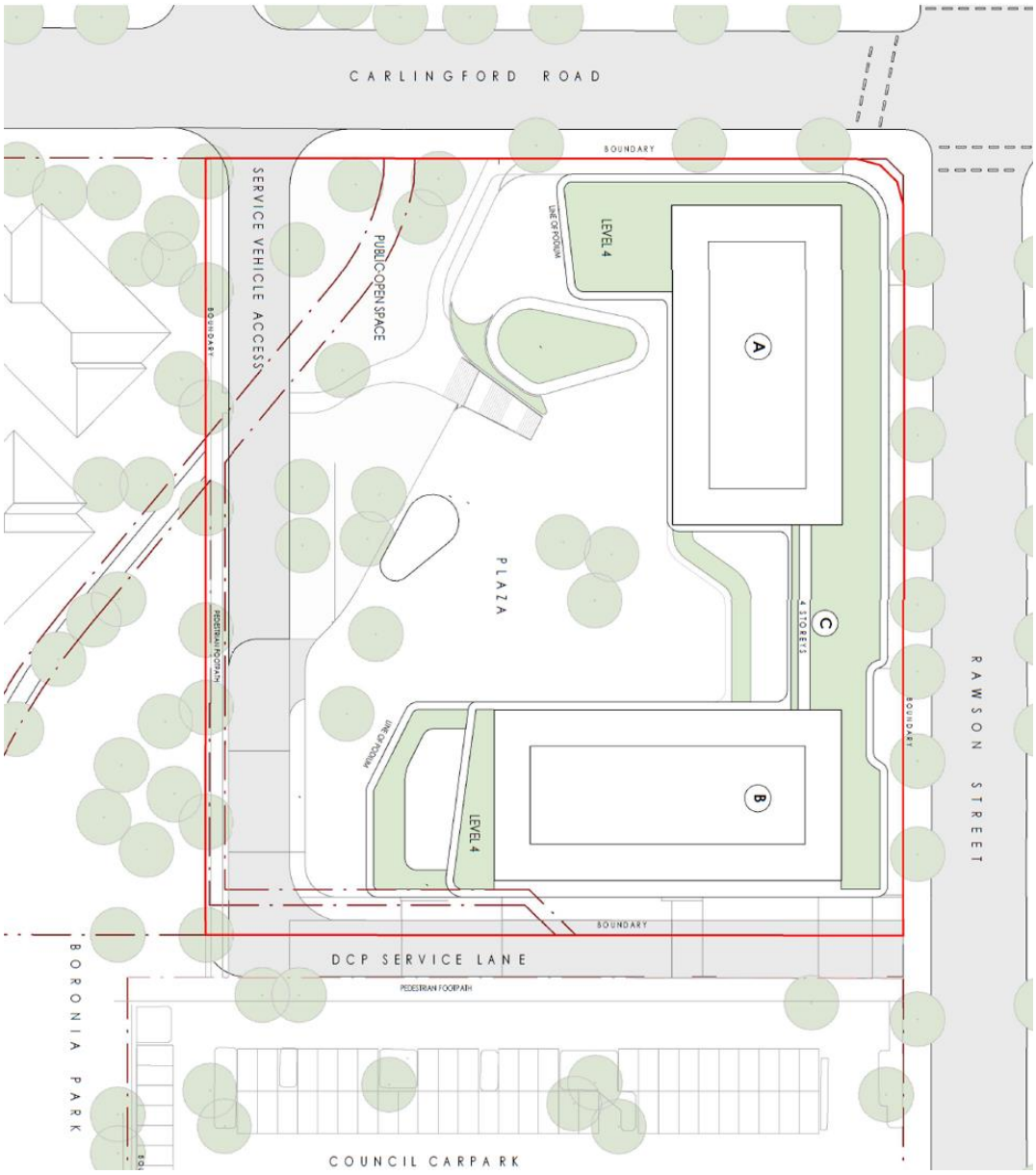


Figure 1: Proposed Site Layout (Tower A = 36 storeys, Tower B = 33 storeys, Podium C = 4-5 storeys)

BACKGROUND

Council Epping Town Centre Commercial Floorspace Planning Proposal

8. On 8 February 2021, Council resolved to endorse a Planning Proposal to increase commercial floorspace in the Epping Town Centre (**Attachment 5**) for Gateway Determination. The Planning Proposal was an outcome of the Epping Town Centre Commercial Floorspace Study, which found that new residential development resulted in a reduction of commercial floorspace that had undermined the Centre's role as a commercial centre.

9. The Planning Proposal sought to help meet the projected demand for commercial floor space over the next 20 years in the Epping Town Centre by mandating a minimum 1:1 of non-residential FSR in excess of the current maximum FSR on all land previously zoned B2 Local Centre, including the current Planning Proposal site.

10. In June 2021, the applicant lodged an application for pre-lodgement advice to inform a future development application (DA) for a mixed-use building comprising three 23 storey towers on the site, seeking to rely on the progression of the Epping Town Centre Commercial Floorspace Planning Proposal. However, in July 2021, Council officers advised that the proposal was unable to be supported due to the uncertainty of the draft Planning Proposal and unresolved issues relating to flooding, traffic, and the built form.

11. On 16 September 2021, the (then) Department of Planning and Environment (now DPHI) issued a Gateway Determination refusing the Commercial Floorspace Planning Proposal. The reasons for refusal were that the provision of "non-residential" floorspace would not guarantee that commercial floorspace will be provided, the extent of application given many sites are already developed, and traffic impacts. In response to the Department's concerns, the subject Planning Proposal seeks to only introduce additional commercial floorspace. The traffic impacts of this will be minimal and can be managed, as is explained in later sections.

12. Given the high strategic importance for additional commercial floorspace opportunities to be realised in order to revitalise the Epping Town Centre, Council officers have been supporting and encouraging applicants to provide commercial floorspace on a site-by-site basis as opportunities arise and where appropriate. The subject site is one of the largest developable sites in Epping and is strategically well located to help provide a significant amount of much needed additional commercial floorspace. Consequently, it is considered that the provision of additional commercial floorspace on this site is a key opportunity that should be pursued to help meet Council's objectives for the town centre.

SITE AND LOCALITY DESCRIPTION

13. The subject site (**Figure 2**) is known as 53-61 Rawson Street, Epping and comprises seven lots legally described as follows in **Table 1**:

Table 1 – Property Address – Lots and DPs

Property Address	**Lot & DP**
53 Rawson Street, Epping	Lots 4-7 in DP 19329
53 Rawson Street, Epping	Lots 8 – 9 in DP 975578
61 Rawson Street, Epping	Lot 1 in DP 710711

Figure 2 – Subject site (yellow) at 53-61 Rawson Street, Epping (source: Nearmap)

14. The site is rectangular and has a combined area of approximately 9,089 sqm. The site contains a four-storey mixed use building to the north comprising education and office related uses and a separate single storey building to the south comprising a Coles Supermarket.

15. The site is zoned E1 Local Centre and is subject to a maximum height control of 48m and a maximum FSR of 4.5:1.

PLANNING PROPOSAL

16. In September 2023, the subject Planning Proposal was lodged by the applicant with Council seeking to amend the Height of Buildings control and to add 1:1 commercial FSR to facilitate a mixed use development comprising three towers. Following detailed review as part of the Planning Proposal assessment it was found that the three-tower configuration was not supported by Council officers as it would adversely impact solar access to the nearby park, as well as view corridors.

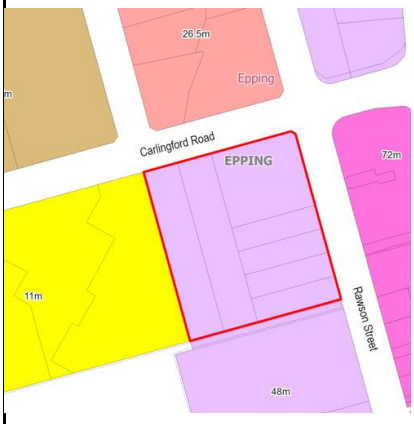
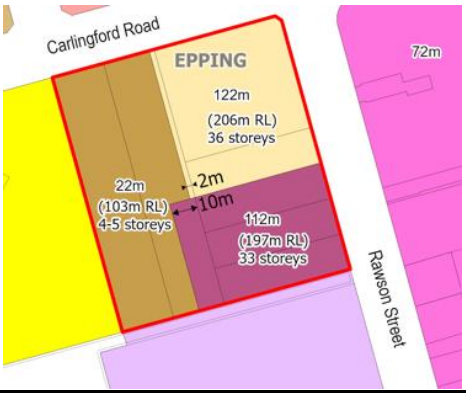
17. In response to these concerns, Council officers developed a preferred scheme which facilitated the same FSR but in a two-tower configuration. Although taller, the two-tower scheme resulted in a preferred outcome that reduced overshadowing to Boronia Park and adjoining land when compared to the applicant's original three tower scheme whilst decreasing the perception of bulk and scale and improving views to sky between and around towers.

18. Following ongoing discussions with the applicant, a revised Planning Proposal was subsequently submitted on 29 April 2024 (**Attachment 1**) that aligned with the Council officer scheme.

19. The Planning Proposal seeks to introduce an additional local provision specific to the site to allow an additional 1.5:1 commercial FSR (approximately 13,677 sqm comprising business, office or retail premises uses). Notwithstanding the existing 4.5:1 FSR, which permits a range of uses (including commercial) in the E1 Local Centre zone, the additional 1.5:1 commercial only FSR will mean that a maximum 6:1 FSR is permitted for the site, with at least 1.5:1 of the permitted FSR to comprise commercial. The increase in commercial floor area is consistent with Council's strategies and reflects the intention of the previous Council led Planning Proposal by seeking to increase commercial offerings within the Epping town centre.

20. An increase in building height is also proposed from 48m to 122m to accommodate the proposed two tower scheme inclusive of the proposed additional commercial floorspace. Refer to **Table 2** below for an overview of the proposed PLEP 2023 amendments.

Table 2: Proposed PLEP 2023 Amendments

	Existing provisions	Proposed provisions
Zoning	E1 Local Centre	No change
FSR	4.5:1 for uses permitted with consent in E1 Local Centre zone	No change to existing 4.5:1 FSR for uses permitted with consent in E1 Local Centre zone. Addition of 1.5:1 commercial only FSR (6:1 FSR overall). Total 54,673 sqm: • 40,996 sqm residential (406 units) • 13,677 sqm non-residential
Height of Building (HoB)	48m 	RL 103 (22m), RL 197 (112m) and RL 206 (122m) 
Additional Local Provisions	Nil	Add a clause to Part 6, Additional Local Provisions of the PLEP 2023 specific to this site that permits an additional commercial only FSR of 1.5:1.

		Notwithstanding the existing 4.5:1 FSR, which permits a range of uses (including commercial) in the E1 Local Centre zone, the additional 1.5:1 commercial only FSR will mean that a maximum 6:1 FSR is permitted for the site, with at least 1.5:1 of the permitted FSR to comprise commercial.

LOCAL AND STRATEGIC MERIT CONTEXT

State Planning Policies and Strategies

21. The Planning Proposal is generally consistent with the relevant state policies and planning strategies including the Greater Sydney Region Plan, Central City District Plan, and Ministerial Directions under Clause 9.1 of the *Environmental Planning and Assessment Act 1979*.

22. The Planning Proposal meets all key objectives of the Greater Sydney Region Plan: A Metropolis of Three Cities. The Planning Proposal will facilitate the delivery of much needed commercial floor space in Epping adding a potential approximately 310 new jobs, and an improved retail offering on the site encouraging the growth of services to meet the needs of local residents (**Attachment 1**).

23. The Planning Proposal meets all the key objectives of the Central City District Plan. The Planning Proposal will facilitate future mixed-use development that will activate the surrounding streetscape including public domain works. Communal open space will be provided for future residents and publicly accessible open space will be provided in the form of a new park in accordance with the requirements of the SSDCP (**Attachment 1**).

Local Strategies

24. The Local Strategic Planning Statement (LSPS) identifies Epping as a Strategic Centre with a broad mix of land uses and a critical focus on infrastructure and growth. The LSPS policy directions state that Epping is a key strategic centre where high-rise development should be focussed (**Attachment 1**).

25. Significantly, the LSPS advocates for the outcomes of the Epping Town Centre Review to identify future employment needs within the Epping Strategic Centre.

26. The Local Housing Strategy (LHS) identifies Epping as a growth precinct within the Parramatta LGA projected to provide 8,910 dwellings by 2036. Priorities for Epping include providing new and upgraded open space as well as community facilities. The Planning Proposal meets these objectives by delivering publicly accessible open space in the form of a new park, communal open areas, and public domain works (**Attachment 1**).

ASSESSMENT OF PLANNING PROPOSAL

Land Use

27. The Planning Proposal seeks to amend PLEP 2023 to enable a greater amount of commercial floorspace in a future mixed-use development than can be accommodated under the current planning controls.

28. The Epping Precinct is identified as a Strategic Centre in the City of Parramatta LSPS and is the key commercial hub (along with the Parramatta CBD) in the LGA. Recent development in the Epping Town Centre has seen the reduction of commercial floorspace that has compromised its role as a key commercial hub. The Planning Proposal acknowledges this concern and states *"Epping continues to experience demand for retail and office floor space, however, development activity has seen commercial uses unable to access appropriate floor space to support their business"* (**Attachment 1**).

29. The Planning Proposal also notes that over the next 20 years there will be demand in the Epping Town Centre for 13,000 sqm of retail floorspace and 55,616 sqm of office floorspace. The established need for commercial floorspace is emphasised by the Planning Proposal and is the principal justification for the additional 1.5:1 FSR being sought.

30. The site presents a key urban renewal opportunity for the Epping Town Centre capable of providing an extensive commercial offering. It is in a highly accessible location, situated adjacent to Boronia Park and within 200m of Epping train station and bus interchange.

31. The Planning Proposal acknowledges the importance of the site in being able to deliver a significant amount of commercial floorspace on the western side of the Epping Town Centre and notes that this is consistent with the Council vision to address the shortfall in commercial floorspace in this area. A critical element in supporting the Epping Town Centre as a key commercial hub is the retention of the supermarket currently operating on the site. The applicant has indicated that they intend for this use to be retained and enhanced as part of any redevelopment of the site.

32. The submitted Planning Proposal recommends that a site-specific provision be added to PLEP 2023 that allows for the mapped FSR to be exceeded by 1.5:1 for "non-residential use". It is recommended that the term "non-residential use" be replaced with "commercial premises" as defined in PLEP 2023. This will include *business premises, office premises and retail premises* but will not include other non-residential uses in the E1 Local Centre zone such as serviced apartments. This will ensure that the additional 1.5:1 FSR is used only for the purposes highlighted in the Planning Proposal and will directly help address the local shortfall in commercial floorspace. The applicant has agreed to Council officer's recommended approach.

33. Other non-residential uses that are otherwise permitted in the E1 Local Centre zone will still be able to be included in any development, however the floorspace utlilised for these other uses can only be drawn from the currently mapped FSR of 4.5:1. This approach is consistent with previous advice provided by DPHI

relating to the Epping Town Centre Planning Proposal that is addressed in further detail below.

34. It is noted that the Planning Proposal is supported by several technical studies and analysis that are considered acceptable for the purpose of seeking a Gateway determination, including:

- Economic Impact Assessment (**Attachment 6**).
- Flooding and Flooding Addendum Report (**Attachment 7**).
- Transport Impact Assessment (**Attachment 8**).
- Social Impact Assessment (**Attachment 9**).
- Wind Assessment (**Attachment 10**).
- Infrastructure Report (**Attachment 11**).

Retail and Economic Impact

35. The Planning Proposal is supported by a concept design that includes a total 13,677 sqm of commercial floorspace comprising:
    - 7,430 sqm of either business or office floorspace.
    - 6,247sqm of retail floorspace (3,100 sqm supermarket and 3,147 sqm specialty retail).
    - 311 additional jobs created.

36. The Planning Proposal also envisages up to 420 residential apartments that can be accommodated in the existing 4.5:1 FSR within the proposed two towers.

37. The Epping Town Centre has undergone significant change in recent years with a significant decline in local commercial floorspace impacted by the introduction of extensive areas of high density residential redevelopment (as a result of planning controls introduced by the State Government in 2014). The economic analysis (**Attachment 6**) notes that there is a clear need for retail and commercial floorspace in the Epping Town Centre and the subject site is well placed to meet a proportion of this demand through the proposed planning provisions. It is therefore recommended that the Planning Proposal can be supported on economic grounds.

Urban Design, Built Form and Public Domain

38. The proposed two tower scheme (**Attachment 4**) will reinforce the role of the site as a key retail and commercial destination whilst providing a mix of open space, residential and commercial uses to support high levels of activation within the site and the locality. The proposed two tower scheme comprises the following (refer to **Figures 3 & 4**):

- 4-5 storey podium (C) – RL 103 = 22m.
- 36 storey tower (A) - RL 206 = 122m.
- 33 storey tower (B) - RL 197 = 112m.

39. A four-tower scheme would be necessary to accommodate the existing 4.5:1 FSR whilst complying with the 48m height limit and PDCP controls. However, noting existing flooding constraints, it is unlikely that a compliant scheme can be realised. The proposed two tower scheme is therefore recommended as the optimal configuration for this site (**Attachment 4**) so that the proposed 1.5:1

commercial FSR and existing 4.5:1 FSR can be accommodated (6:1 total). The two-tower scheme will not result in adverse overshadowing to Boronia Park and adjoining land, will minimise the perception of bulk and scale, and provide improved views to sky between and around towers. The proposed height is comparable to nearby towers further to the east, which form part of the visual catchment of the site.

40. Publicly accessible open space is proposed on the ground floor comprising a 1,230 sqm park and 3,370 sqm plaza. The public open space is a requirement of the SSDCP. It will not be dedicated to Council given it is located above a basement, however Council would seek to secure an easement for public access. This will deliver improved site permeability, safety and security and activation of Rawson Street and Carlingford Road. The new park may include play elements that serve both children and adults such as climbing mounds, social lawn, bridge crossing and interpretive art, subject to DA assessment.

41. Council officers have amended the applicant's proposed Height of Buildings map that was provided in their Planning Proposal (refer to **Attachment 1** and **Attachment 2**) to better align the height mapping with the applicant's two tower scheme (**Attachment 4**). The applicant has since agreed with Council officer's recommended height mapping.

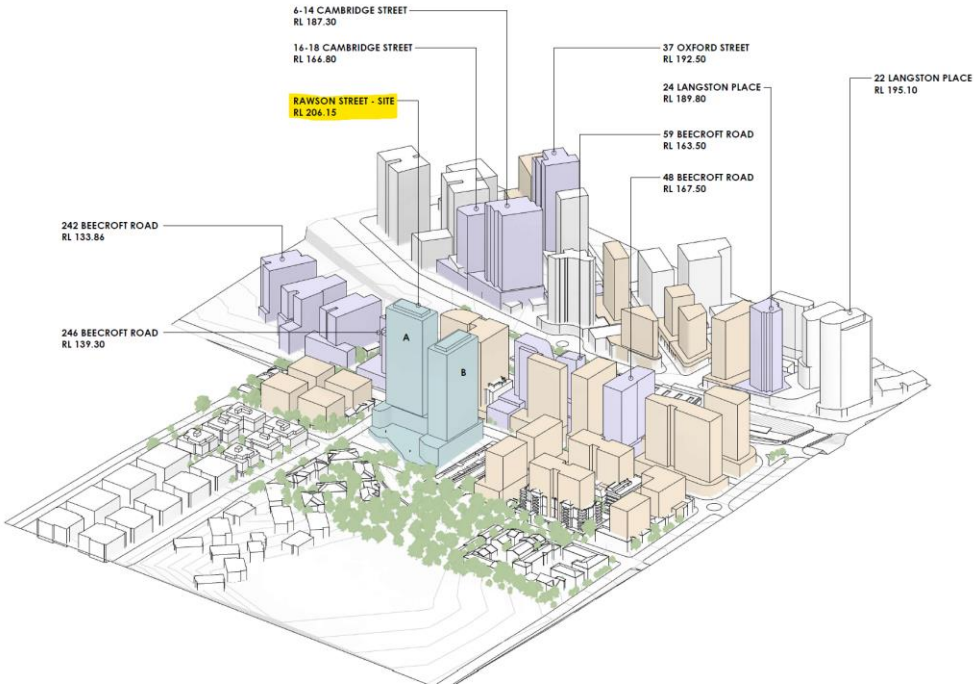


Figure 3: Epping Town Centre Built Form (existing developme–t - white, approved developme–t - purple, development possible under existing controls – orange, proposed subject site development – blue)

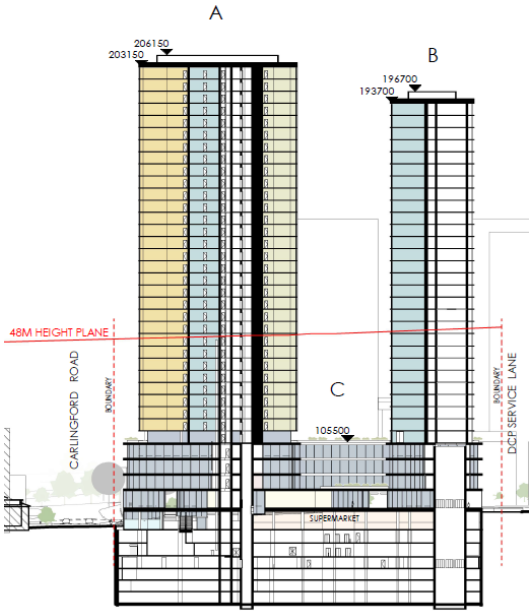


Figure 4: Proposed Scheme in section (looking east)

FLOODING

42. The site is affected by mainstream flooding from the Boronia Park Channel (located to the southwest of the site with depths between 1-10m during a 1% Annual Exceedance Probability (AEP) flood event – **Figure 5**), and negligible overland flooding/drainage. The flood affectation during the 1% AEP is isolated to the northwestern portion of the site, outside of the proposed building footprint. The submitted flooding report and flooding report addendum (**Attachment 7**) states that Epping Town Centre has a very low flood risk overall, and that flood poses a low risk to the building and its users. It also states that the change in flooding impacts (during a Probable Maximum Flood event) following the proposed redevelopment of the site is minor and poses low risk to the community.

43. The flood reports conclude that flooding concerns can be mitigated at DA stage through such measures as:
    - a raised entrance crest to the basement level;
    - flood gates;
    - the first level with pedestrian access being located above the 1% AEP + freeboard and the PMF flood level (achieved in reference scheme);
    - residential floors being above the PMF flood level (achieved in reference scheme); and
    - a shelter-in-place strategy could be implemented if required.

44. It is noted that the public park shown on the indicative architectural drawings (**Attachment 4**) is proposed to be located on the flood affected part of the site given that buildings cannot be sited in this location, which would result in impacts upon flood storage.

45. Council's Flood Engineer generally concurs with the report findings and prospective risk management measures but raises some concern with the intensity of use of the proposed western laneway that traverses the flood affected portion of the site, and the use of mitigations such as flood gates. It is considered that concerns related to flooding can be properly explored at the DA stage once the building use and configuration is known, which will dictate the number of

occupants and vehicle movements and thus, the level of risk. It is anticipated that flooding issues can be mitigated however in-line with the recommendations of the flooding reports noted earlier, particularly noting the low flood risk of the site.

46. Considering the low flood risk of the site and that risks associated with flood affectation can be overcome subject to flood risk management and further analysis at the DA stage, it is recommended that the access provision can be supported for the purposes of the Planning Proposal and SSDCP. Flood-specific planning controls are included in the SSDCP (**Attachment 3**) including controls that require the submission of a satisfactory Flood Management Plan, and the provision of flood mitigations as described above and detailed in the flooding report and flooding report addendum (**Attachment 7**).

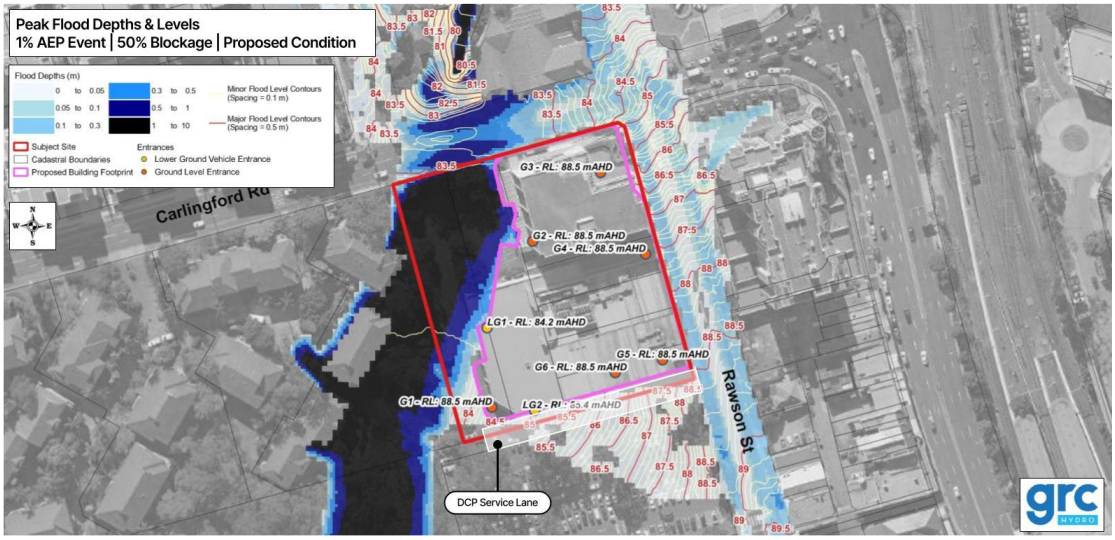


Figure 5: Flood affectation of the site during 1% AEP event

TRAFFIC AND TRANSPORT

Active and Public Transport

47. The site is close to the Epping Metro and Train Station. The City to South West Metro extension will further improve accessibility between Epping and the Sydney CBD (and other centres) when it commences operation.

48. A raised midblock pedestrian crossing on Rawson Street is near the subject site. The pedestrian crossing links the west of Rawson Street (via a pedestrian through link) to Epping Train Station. Council officers have been discussing an option with the applicant 1401ignalizeise this pedestrian crossing to improve traffic flow along Rawson Street given the crossing is currently over-capacity (refer to Traffic Generation section below for more information).

Vehicular Access

49. The current PDCP requires a right-angle service lane through the site along the southern and western boundaries connecting Rawson Street and Carlingford Road. The applicant proposes to retain the same laneway configuration with access off Rawson Street (via a controlled intersection) for general traffic (given that this access would not be flood affected) and a service lane for service vehicles off Carlingford Road.

50. Council's Traffic Engineer supports the proposed laneway access off Rawson Street and Carlingford Road but recommends the Carlingford Road access be utilised by both service and private vehicles as this would reduce traffic volumes in Rawson Street. The extent of use of the Carlingford Road access can be determined as part of the detailed design that will be required should a development application be lodged for the site.

51. It is noted that the submitted two tower scheme (**Attachment 4**) is based upon the existing laneway configuration provided in the current DCP, which has been carried into the draft SSDCP. The laneway configuration envisages half of the proposed southern laneway being constructed on adjoining Crown land that Council is in the process of compulsorily acquiring. In this respect, Council resolved in June 2023 to pursue acquisition of this land (**Figure 6**), for the *purpose to facilitate access to Boronia Park and improve the road network in the Epping Town Centre*.

52. Notwithstanding, there has been no commitment from Council that the land to be acquired will be made available to help facilitate development of the subject site, particularly noting that the use of the Council car park would need to be considered as part of any future master planning process for the surrounding area (refer to proposed Epping Town Centre Master Plan section). If a portion of the laneway is not constructed on Council land as envisaged, alternative options would need to be explored, which could include:

    - construction of the laneway solely on the applicant's land
    - construction of only half of the laneway on the applicant's land to be utilised as a one-way access
    - providing direct basement access from the Rawson Street frontage

53. Any such options as those identified above would need to be demonstrated as part of any future DA and be subject to traffic and flooding considerations (refer to Assessment of Planning Proposal section). If the applicant does seek to provide the laneway partially on the land that Council is currently being compulsorily acquired, suitable negotiations will need to be entered into with Council.

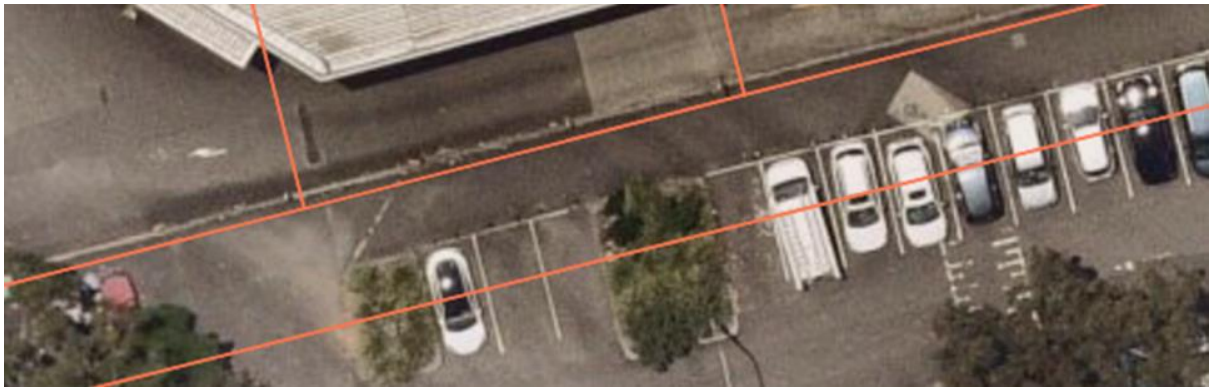


Figure 6: Enlarged aerial view showing site boundary with Council car park including disused strip of land immediately north of parking spaces

54. As part of the preparation of the subject Planning Proposal, input was sought from Transport for NSW (TfNSW) who have provided correspondence to the applicant and Council for consideration before the Planning Proposal is submitted for Gateway. Matters for consideration included:

- How the design responds to various vehicle and pedestrian upgrades earmarked in the Outside CBD Contributions Plan.
- TfNSW advice on service vehicle access in the laneway.
- Acknowledgement of the applicant's suggested additional eastbound lane along Carlingford Rd, and TfNSW offering to be involved in these discussions.
- Suggesting the Transport Impact Assessment be updated to include a warrants assessment and safety assessment in relation to the applicant's suggestion to upgrade the zebra crossing south of the Council car park with a signalised crossing.

55. The TfNSW correspondence does not object to the Proposal and the measures suggested by TfNSW have been addressed in the applicant's revised Transport Impact Assessment (TIA) (see Table 1.1 - **Attachment 8**).

Traffic Generation

56. The applicant's revised TIA (**Attachment 8**) states that the development of the site is expected to generate approximately 273 and 450 new vehicle trips in total in the AM and PM peak hours (including service vehicle trips). When compared to the existing development on the site, the proposed development as a whole (i.e. 6:1 FSR) will generate a net increase of approximately 132 and 138 vehicle trips in the AM and PM peak hours.

57. The proposed traffic anticipated to travel through the key surrounding intersections is expected to be relatively minor, contributing up to 3% additional traffic compared to existing traffic volumes. It is noted that this 3% traffic increase will occur once the entire site is developed at the proposed 6:1 FSR, therefore, the additional traffic increase associated with just the proposed 1.5:1 commercial FSR component would be less than 3%.

58. Some additional impact is expected to occur on the Carlingford Road/Rawson Street/Ray Road intersection during the AM peak hour given the intersection already has limited capacity for right turns from Rawson Street to Carlingford Road. Notwithstanding the subject Planning Proposal will have a minimal impact upon this existing constraint.

59. Council's Traffic and Transport team have been working closely with the applicant on mitigations that could be undertaken to lessen existing and potential future impacts upon the pedestrian and road network. The following pedestrian crossing and road upgrades are currently being explored, which are identified in Council's outside CBD Contributions Plan:

    - New signalised pedestrian crossing – install an operated signal crossing to the south of the Council car park on Rawson Street. In conjunction with this, the applicant and Council officers are also investigating the potential removal of the pedestrian crossing on the eastern approach to the Carlingford Road/Rawson Street/Ray Road intersection. According to the applicant's revised TIA (**Attachment 8**) the removal of the pedestrian crossing would result in greater "effective green time" for left turning vehicles from Ray Road and right turning vehicles from Rawson Street.

- Rawson St upgrades - lengthening the existing left turn slip lane from Carlingford Road onto Beecroft Road to provide a full-length lane between Rawson Street and Beecroft Road, and conversion of the lane to allow both right and left turn movements from Carlingford Road onto Beecroft Road. According to the applicant's TIA, the provision of three lanes will provide greater opportunity for vehicles from Rawson Street to turn onto Carlingford Road.

60. The new signalised pedestrian crossing and Rawson St upgrade works are envisaged to take between 5-10 years according to Council's works program. The proposed additional 1.5:1 commercial only FSR will generate additional contributions in accordance with Council's Outside CBD Contributions Plan, contributing up to $2,506 per additional worker based upon a sqm rate that ranges from 20 sqm per worker (for an office premises) up to 224 sqm per worker (for a vehicle sale or hire premises – a type of retail premises). According to the submitted Economic Assessment (**Attachment 6**), the proposed 1.5:1 commercial FSR (13,677 sqm approx.) will comprise:

    - 7,430 sqm of either business or office floorspace = estimated development contributions of $930,979 (office premises) or up to $423,172 (business premises).
    - 6,247sqm of retail floorspace (3,100 sqm supermarket and 3,147 sqm specialty retail) = estimated development contributions of $141,247 (supermarket) and $138,357 (speciality retail).

61. Based on the above figures provided by the applicant, the estimated development contributions would be up to $1,210,583 (should office premises be pursued under first option above). The applicant could opt to either pay these additional contributions (whereby Council would undertake the works in accordance with the Outside CBD Contributions Plan) or carry out the works and have the contributions offset via a Works in Kind Agreement at the development application stage.

62. Considering the minor increased traffic that will result from the additional floorspace that would be permitted under the Planning Proposal, and that mitigations are being investigated to lessen existing pedestrian and traffic impacts, the Planning Proposal is supported noting the critical need for commercial activation of the Epping Town Centre.

63. The proposal will also be formally referred to TfNSW should this Planning Proposal proceed to public exhibition where feedback will be sought as to whether they are satisfied with the measures proposed in the submitted Transport Impact Assessment following their preliminary advice on this matter which does not raise any objection to the Planning Proposal.

RELATIONSHIP TO EPPING TOWN CENTRE PLANNING PROPOSAL

64. As noted earlier, Council has previously sought to increase the provision of commercial development within the Epping Town Centre via a precinct wide Planning Proposal that was refused by DPHI at Gateway stage despite that Planning Proposal demonstrating a general strategic alignment with relevant State and local strategic plans.

65. A key reason provided by the now DPHI for the refusal of the previous Planning Proposal was that there was no guarantee that the intended outcome of the Planning Proposal would be achieved. Specifically, the Council initiated Planning Proposal sought to allow an additional 1:1 FSR for "non-residential uses" above the existing mapped FSR. The now DPHI Gateway Determination report stated that *"It is considered that if the market deems it more feasible to provide other non-residential uses over commercial floorspace, than these other non-residential uses will be provided by landowners unless the provision of commercial floorspace is specifically mandated by the proposed provisions"* (Gateway Determination Report – P8).

66. The precinct wide Planning Proposal identified that not all sites within the identified area could deliver the intended outcome as they had already been recently developed, had recent development consents or were constrained due to their lot configuration. The Gateway Determination report noted that a more targeted approach to sites that can in fact deliver the intended outcome would be preferred. The site at 53-61 Rawson Street is one such site that can deliver this intended outcome and hence is being pursued as a site-specific Planning Proposal in this instance. As a result, the subject Planning Proposal addresses the concern about the nature of uses that the additional floorspace would be used for by recommending that the additional FSR to be provided under this Planning Proposal be instead required to be provided as *commercial premises*.

67. The Gateway Determination report also stated that the Planning Proposal was not supported due to it resulting in a worsening traffic outcome for the Epping Town Centre. This was reinforced by advice from TfNSW advising that Council's Proposal not be supported. The subject Planning Proposal will only result in a minor increase in traffic generation that will not result in adverse impacts to the extent they were projected under the previous Planning Proposal. As noted earlier, the advice provided by TfNSW does not object to the subject Planning Proposal (refer to Traffic section) but will be referred to them again should it proceed to public exhibition.

68. It is noted that the Council Planning Proposal also sought an increase in height from 48m (15 storeys) to 80m (24 storeys). Whilst this is less than what is currently proposed under the subject Planning Proposal (122m / 36 storeys) subsequent analysis of the flooding constraints presented by the site indicate it is unlikely that the 1:1 commercial proposed under Council's Planning Proposal in conjunction with the existing 4.5:1 FSR could have been reasonably accommodated within the proposed 80m height.

PROPOSED EPPING TOWN CENTRE MASTER PLAN

69. At the Council Meeting on 13 May 2024, a Notice of Motion was considered that sought to commence the preparation of a scoping study to prepare a Master Plan for the Epping Town Centre. Council resolved that a scope for the preparation of the Master Plan be prepared that addresses a range of issues including laneways and circulation within the precinct as well as opportunities to improve traffic and accessibility and built form and public domain interfaces. The Master Plan will also consider the role of Council's Rawson Street car park to the immediate south of the subject site in achieving its objectives and requirements for Epping.

70. Council also resolved that the Master Plan inform a potential review of the existing planning controls for the Centre and it provide costs and timing for any changes that may be proposed. The scoping report will be prepared in the coming months.

SITE SPECIFIC DEVELOPMENT CONTROL PLAN

71. A draft Site-Specific Development Control Plan (SSDCP) (**Attachment 3**) has been prepared by the applicant to accompany the Planning Proposal. The draft SSDCP provides details on site arrangement, road layout, envelope controls and open space including public domain parameters consistent with the concept design for the site.

72. The draft SSDCP will amend controls specific to the Epping Local Centre as outlined in Parramatta DCP 2023 (Part 8.1.1.1) and will provide site-specific controls for:

- Site layout and envelope - establishing a site plan that dictates the future location of built form, streets, and public domain.
- Open space and public domain - setting out the quality and character of the internal plaza and publicly accessible open space area.
- Laneway access - to be supported by appropriate design treatments and flood control measures.
- Setbacks - bespoke controls responding to the corner location at Carlingford Road and Rawson Street and site constraints.
- Building height and number of storeys – requires two towers only, and height in storeys to correspond with the proposed PLEP 2023 height control.
- Floor to floor heights - to meet National Construction Code requirements, structure, and servicing input (falls within the slab).

PLAN-MAKING DELEGATIONS

73. Should Council resolve to endorse the Planning Proposal to proceed, it is recommended that Council request that it exercise its plan-making delegations. This means that once the Planning Proposal has been to Gateway, undergone public exhibition and been adopted by Council, Council officers will deal directly with the Parliamentary Counsel Office on the legal drafting and mapping of the amendment. The LEP amendment is then signed by the CEO before being notified on the NSW Legislation website.

CONSULTATION & TIMING

74. The Planning Proposal and supporting documents were referred internally to various Council staff/teams including City Design, Flooding and Traffic, and Open Space teams. External referrals were also issued to TfNSW and DPHI, who have not objected to the Planning Proposal.

FINANCIAL IMPLICATIONS FOR COUNCIL

75. Should Council resolve to proceed with the Planning Proposal, the costs incurred in conducting the community consultation are covered by the fees associated with the submission of the Planning Proposal.

CONCLUSION AND NEXT STEPS

76. This report recommends that the Planning Proposal for 53-61 Rawson Street, Epping be submitted to the DPHI for Gateway assessment.

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Project Officer Land Use

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Group Manager, Major Projects and Precincts

Jennifer Concato
Executive Director City Planning and Design

ATTACHMENTS:

1	Applicant's Planning Proposal Report	102 Pages
2	Additional Local Provisions Map and HOB Map	2 Pages
3	Draft Site Specific DCP	
4	Indicative Architectural Drawings (two tower scheme) and Public Domain Plans	25 Pages
5	Previous Council Planning Proposal	163 Pages
6	Economic Impact Assessment	39 Pages
7	Flooding Report and Flooding Addendum Report	78 Pages
8	Transport Impact Assessment	246 Pages
9	Social Impact Assessment	2 Pages
10	Wind Assessment Report	22 Pages
11	Infrastructure Report	23 Pages

REFERENCE MATERIAL

Mecone

Amended Planning Proposal Report

Planning proposal to amend *Parramatta Local Environmental Plan 2023*

53-61 Rawson Street, Epping

PREPARED FOR
CANJS PTY LTD

APRIL 2024
MECONE.COM.AU

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C	25/08/23	Final Draft	Jordan Faeghi
D	01/09/23	Final	Jordan Faeghi
E	04/09/23	Lodgement	Adam Coburn
F	23/04/24	Amended Report	Jordan Faeghi

* This document is for discussion purposes only unless signed and dated by the persons identified. This document has been reviewed by the Project Director.

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Executive summary

This Planning Proposal Report (**PPR**) has been prepared by Mecone Group (**Mecone**) on behalf of Canjs Pty Ltd (the **proponent**) in support of proposed amendments to *Parramatta Local Environmental Plan 2023* (**PLEP 2023**) for 53-61 Rawson Street, Epping (the **site**).

This PPR and associated technical documentation have been updated to reflect post lodgement consultation with Council.

THE SITE

The site comprises seven (7) allotments with an area of approximately 9,089m². It is developed with a single storey Coles Supermarket and a four (4) storey mixed use building with education and office related uses.

The site is the largest consolidated landholding in single ownership on the western side of Epping and within the nucleus of a Strategic Centre. It is located within 200m walking distance of Epping train station, metro and bus interchange.

FIGURE 1 – SITE AERIAL
Source: Kann Finch

BACKGROUND

The planning proposal builds on several years of strategic investigations led by City of Parramatta Council (**Council**) into the role and function of Epping to provide jobs and commercial floor space to reinforce its status as a Strategic Centre. While studies have occurred since 2012, the most recent investigations include the Phase 1 Epping Planning Review and the subsequent planning proposal prepared by Council.

Phase 1 Epping Planning Review

This included the Phase 1 Epping Planning Review in 2017, which determined that the current planning framework was not fit for purpose and that the form of development occurring was viewed as inconsistent with the strategic vision of Epping as set out in State and local planning policy

Council Planning Proposal

The findings of the Phase 1 Epping Planning Review culminated in a Council-led planning proposal for Epping (**PP-2021-3070**), which proposed a non-residential commercial floor space control in the centre whilst also increasing heights. This was to ensure commercial floor space was viable to be delivered but not at the expense of residential to maintain the viability of urban renewal.

At the time, the planning proposal resulted in a non-residential floor space control (**FSR**) of 1:1 (5.5:1 in total) and increased heights up to 80m on the site.

The planning proposal was supported by the Local Planning Panel (**LPP**) and Council endorsed the planning proposal to proceed to a Gateway determination on 8 February 2021.

Department Assessment

On 12 October 2021, the Department of Planning and Environment (the **Department**) recommended that the proposal not proceed. The Department acknowledged the planning proposal had strategic alignment but lacked sufficient information to support its progression including need for additional technical studies to determine centre-wide cumulative impact.

It recognised provisions, which specifically targeted select sites as wielding development potential, could better achieve the intended outcome. The site was strategically located and was the largest site subject of the entire planning proposal.

Overall, there is a clear and consistent strategic line of sight to support the planning proposal and renewal of Epping into a vibrant and activated centre.

The site represents the only viable urban renewal opportunity at scale to positively transform Epping with a significant quantum of non-residential floor space and a high quality public domain and open space offering, acting as a focal point for residents.

ENGAGEMENT

In parallel with Department's assessment of the Council-led planning proposal. The proponent and wider consultant team engaged constructively with Council's development assessment team and Design Excellence Advisory Panel (**DEAP**) to determine the best outcome for the site.

The main difference between the proponent's masterplan and PP-2021-3070 was the redistribution of height to produce tower variation across and deliver improved environmental amenity. Council's proposal introduced a blanket 80m (approx. 20 storeys) height across the site, while the proponent's concept increased heights up to 30 storeys on one building and reduced heights to 17 storeys on another.

Key drivers of the proposal included a new full-line supermarket as a key retail destination. The masterplan was developed in concert with Council's planning proposal and input from the DEAP to guide many of the built form outcomes.

The final DEAP workshop on 20 January 2022 noted the following:

> ***The general massing and building heights are considered acceptable*** *however the Panel suggested alternative solar study software. The proposed materials and colours of the towers were not addressed in detail and the Panel assumes the next presentation will provide further architectural resolution.*
>
> (our emphasis added)

Overall, the proponent has undertaken extensive engagement with Council officers and the DEAP over two years, which has culminated in the form of the proposal, which is generally consistent with the outcomes envisaged in PP-2021-3070.

The proponent advanced its plans to submit a planning proposal, which was accepted by Council on 19 September 2023 and was allocated the number RZ/3/2023 and NSW Planning Portal reference number PP-2023-1919.

POST LODGEMENT ENGAGEMENT

Following lodgement of the planning proposal, the proponent has engaged constructively with Council officers to make a series of refinements in direct response to a Request for Information (**RFI**) dated 22 December 2023. These refinements have resulted in an amendment to the planning proposal and masterplan including:

- Amendments to the proposed RLs now being RL 130, 197 and 207 to reflect the refined massing form,
- Additional 0.5:1 non-residential FSR on top of the previously submitted 1:1 non-residential FSR (1.5:1 non-residential in total),
- Reconfiguration of the masterplan, reflecting a two tower scheme with heights of 33 and 36 storeys and a 4-5 storey podium.

Overall, the engagement post lodgement highlighted a broad appreciation by both Council and the proponent of the nuanced nature of the site and its capacity to deliver a full-line supermarket and additional non-residential floor space to support the revitalisation of the western side of Epping as a key retail and mixed-use destination. The site will support Council's long-standing vision to facilitate additional employment opportunities in Epping and will generate approximately 311 jobs directly related to operational activity on the site. The revised masterplan is provided in **Figure 2**.

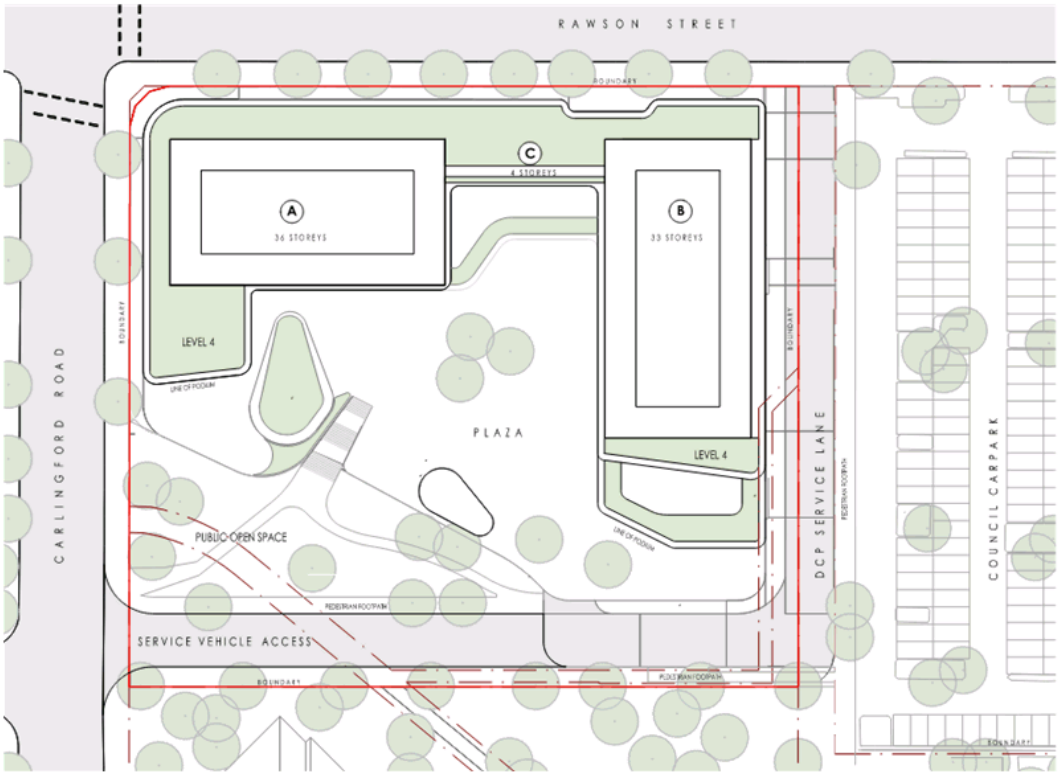


FIGURE 2 – REFINED MASTERPLAN
Source: Kann Finch

While the massing has evolved through the lodgement process, the intended outcomes continue to maintain a strong strategic line of sight of State and local planning policy and satisfy site-specific merit considerations.

This PPR and associated technical documentation have been updated to reflect the post lodgement consultation with the revised masterplan.

CENTRES REVIEW

A detailed review was undertaken of Strategic Centres across metropolitan Sydney and furthermore, centres along the northwest Metro corridor. The review looked at the following density controls across a number of comparable Strategic Centres including:

- Sydney Olympic Park – 149m (future metro),
- Chatswood – 140m (metro based),
- St Leonards and Crows Nest – 138 (metro based),
- Macquarie University – 130m (metro based),
- Blacktown – 100m,
- Liverpool 100m,
- North Ryde – 92m (metro based but not a Strategic Centre), and
- Hornsby 77.5m, and
- Epping – 72m (metro based).

Overall, the current height and FSR controls in Epping, which benefits from both heavy rail, metro and extensive bus network, are relatively modest. As a result of Epping's higher FSR (4.5:1) but lower height (72m), there has been a historical mismatch in density controls. In this respect the proposed amendments are seen to be complementary and consistent with the existing heights in Epping.

STRATEGIC JUSTIFICATION AND NEED

There is a strong and compelling justification and need for the proposal include the following:

- Many sites in Council's planning proposal would not benefit i.e. resulted in unacceptable overshadowing, heritage impacts to items and conservation zones, unable to be supported by infrastructure and inadequate consideration of traffic. This leaves limited opportunities to provide substantial non-residential floor space while incentivising renewal within the western part of Epping.

- Investigations undertaken by the project team demonstrates that of all the opportunity sites within the western town centre, the subject site is the only site with capacity to accommodate the large scale retail format (i.e. lot size, frontage with, access arrangement, proximity to heritage fabric, recent DA approvals etc).

- The basis of the proposal is commercial floor space – a non-residential FSR of 1.5:1 supports the renewal of 4.5:1 residential. It ensures future renewal does not erode residential capacity in Epping but delivers true mixed use outcome with a full-line supermarket and associated specialty retail offerings as a catalyst for the main street precinct.

- Following discussions with Council post-lodgement, it was agreed the site could accommodate an additional 0.5:1 of non-residential FSR above the originally proposed 1:1 non-residential FSR. The additional 0.5:1 non-residential floor space is depicted on the refined massing to accommodate 4,544m^2 of commercial areas. The overall provision of 1.5:1 of non-residential FSR will enhance employment opportunities within Epping consistent with Council's draft Economic Development Strategy, which identifies Epping as 'A major employment and business hub…'.

- The originally submitted proposal provided a non-residential FSR of 1:1, which replaced the existing non-residential uses on the site. The additional 0.5:1 provides for net increase in non-residential uses capable of being delivered.

- The additional 1.5:1 at basement/ground/podium floorplates and the significant site constraints necessitate an increase in height to support residential tower floorplates and to facilitate high quality amenity outcomes for the commercial/retail levels. The permeable retail levels complement and achieve a superior outcome to a more conventional 'box-like' shopping centre model.

- It allows for the proposed heights to be achieved commensurate with the proposed FSR, addressing the historical mismatch between height and FSR controls in the centre. It will fully support the delivery of new housing and employment in a true mixed use manner.

- It represents a more refined, site-specific approach, which has enabled best design and amenity practice to be applied. As such, appropriate technical analysis have been incorporated to ensure the site is able to achieve a 1.5:1 non-residential floor space, thereby aligning with the strategic planning framework.

- It is the most effective way of providing assurance to Council, the Department and the community that genuine commercial floor space can be delivered, whilst also supporting renewal that positively contributes to the community and public domain. The built form outcomes of the proposal will be implemented via a site-specific DCP to support the location of land uses, high quality built form and architectural design and a high standard of public domain areas.

THE PROPOSAL

The overall outcome of this robust analysis and iterative design testing has been the preferred masterplan, which exhibits the best outcome for the site and Epping broadly. The work that has informed these outcomes includes:

- Flood analysis of Devlins Creek, prepared by GRC Hydro,
- Massing analysis of various built form options and architectural design, prepared by Kann Finch,
- Pedestrian movement analysis, prepared by Space Syntax,
- Landscape concept strategy and Connecting with Country narrative, prepared by Aracdia, and
- Urban design review and strategy, prepared by Gyde.

FIGURE 3 – MASSING RENDER AERIAL
Source: Kann Finch

A summary of the key elements and vision of the masterplan include:

ITEM	DESCRIPTION
Land uses	Retention and expansion of the existing supermarket offering and supporting speciality retail, commercial and residential
Building form	2 x mixed use buildings supported by podium: Building A = 36 storeys (RL 206)

ITEM	DESCRIPTION
	Building B = 33 storeys (RL 197) Basement parking and loading areas – DCP compliant
Gross floor area	Approx. Residential – 40,996m² = 4.5:1 Approx. Non-residential – 13,677m² = 1.5:1
Apartments	Approx. 406
Publicly accessible open space	4,600m² = 50%
Communal open space	3,167m² = 35%
Deep soil	1,230m² = 13.5%
Car parking	Complaint with the DCP

PROPOSED AMENDMENTS

The planning proposal seeks the following amendments to PLEP 2023.

- Amend the height of buildings control to provide a maximum height ranging from RL 197 and 206, equating to heights of 112m and 123m and buildings of 33 and 36 storeys, and
- Introduce a requirement for a non-residential floor space ratio (**FSR**) of 1.5:1 through an additional local provision.

An amendment to the DCP has been prepared in consultation with Council to ensure the project delivers a high standard of architectural design and give effect to the preferred masterplan.

No changes to the underlying land use are proposed.

STRATEGIC MERIT

The planning proposal expressly meets and delivers new housing supply and employment opportunities in a manner expected by Council's LSPS and will assist Epping in reaching its targets by 2036. In particular, the planning proposal fulfills the stated role and purposes of Strategic Centres, as established in the District Plan.

- High levels of private sector investment,
- Flexibility, so that the private sector can choose where and when to invest,
- Co-location of a wide mix of activities, including residential,
- High levels of amenity, walkability and being cycle-friendly, and
- Areas identified for commercial uses, and where appropriate, commercial cores.

It will facilitate Council's objectives for Epping as a key Strategic Centre, supported by appropriate levels of employment floor space and high quality open space and amenity. It has been the subject of evidence-based urban design testing and analysis that aligns with State and local objectives to achieve a high quality place supported by open space and civic amenity.

Additionally, economic modelling indicates the proposal will make a significant contribution to Parramatta's economy, generating an annual GRP of $88.6 million to the local economy and supporting up to 311 FTE on-site. It will contribute to meeting demand for retail and local commercial services and facilitated reduced 'escaped expenditure' and travel to other centres.

The planning proposal exhibits strong strategic merit and represents a clear line of sight between State and local strategic planning objectives. It is consistent with the following key priorities of the District Plan:

- C1 – Planning for a city supported by infrastructure,
- C2 – Fostering healthy, creative, culturally rich and socially connected communities,
- C5 – Provide housing supply, choice and affordability, with access to jobs, services and public transport,
- C9 – Delivering integrated land use and transport planning and a 30-minute city,
- C10 – Growing investment, business opportunities and jobs in strategic centres,
- C16 – Increasing urban tree canopy cover and delivering Green Grid connections, and
- C7 – Delivering high quality open space.

The planning proposal is also entirely consistent with planning priorities and actions contained in the LSPS:

- **Planning Priority 4**: Focus housing and employment in the GPOP and Strategic Centres; as well as stage housing release consistent with the Parramatta Local Housing Strategy (when endorsed),
    - Focus high-rise development in Parramatta CBD and Strategic Centres (Epping and Sydney Olympic Park) as shown on the Structure Plan Map,
- **Planning Priority 11:** Building the capacity of the Parramatta CBD, Strategic Centres, Local Centres and Employment Lands to be strong, competitive and productive, and
- **Action 69:** Advocate for the recommendations of Epping Town Centre Review (when completed) and implement the adopted recommendations.

The planning proposal is also consistent with Council's draft Economic Development Strategy, which states the following future role of Epping:

> *A major employment and business hub, it will capitalise on improved transport links to Parramatta CBD, and proximity to the Macquarie Park Innovation District*

The planning proposal therefore exhibits strong strategic merit and represents a clear line of sight in Council policy and studies that have occurred over the past decade to fulfill Epping's role as a key strategic centre.

The planning proposal demonstrates site-specific merit through delivery of additional non-residential floor space commensurate with increased heights to support the renewal of the site. The basis of the proposal is commercial floor space and a non-residential FSR of 1.5:1 supports the renewal of 4.5:1 residential.

It ensures future renewal does not erode residential capacity in Epping but delivers a true mixed use outcome with a full-line supermarket and associated specialty retail offerings as a catalyst for the main street precinct.

SITE SPECIFIC MERIT

The planning proposal exhibits site-specific merit for the following reasons:

- **Employment generation** – the site is a strategic opportunity for Epping to facilitate positive urban renewal, revitalise and expand the existing full-line Coles Supermarket and specialty retail. As described throughout this report, there is an under-provision of supermarket offerings

in Epping.

- **A major site in a Strategic Centre** – comprehensive analysis of other sites in Epping centre conclude the site is the only viable and significant landholding capable of delivering a significant non-residential floor space in tandem with the creation of a key retail destination on the western side of Epping. The proposed built form is justifiable from a planning perspective for the following reasons:
    - The proposed heights are comparable to existing approved developments on the eastern side of Epping and will balance the centres skyline profile,
    - The masterplan went through Council's DEAP prior to lodgement, which confirmed the heights and massing were considered acceptable. While the proposal has been refined post-lodgement, the premise for additional density of this site remains valid,
    - The site is unique in its size and lot configuration in facilitating a full-line supermarket and specialty retail, which could not be accommodated elsewhere in Epping,
    - The height reflects the provision of an additional 1.5:1 of non-residential FSR, which has been a key driver for the proposal and aligns with Council's long-standing vision to see Epping become a major employment hub, and
    - The minor flood affectation on the north western corner of the site has limited the developable area for built form, which has resulted in additional height to utilise the existing 4.5:1 and the additional non-residential 1.5:1 FSR proposed. This has equally turned into a major site opportunity in enhancing publicly accessible open space for visitors and residents, while also managing transition to adjacent areas.

- **Compatible land use and built form** – extensive urban design review and testing has been undertaken with Council's DEAP and with further refinements with Council's urban design team, which has resulted in the creation of a compatible urban form within the context of a high density strategic centre, whilst also ensuring high levels of amenity are achieved for future occupants including exceeding ADG criteria and generating minimal off-site impacts.

- **No environmental constraints** – there are no environmental constraints that would limit or act as a barrier to the site's redevelopment. Where flooding is identified, this is easily accommodated in the future proposal and preferred masterplan.

- **Open space** – the site delivers a generously sized park, which represents 13.5% of the site area. This park will be publicly accessible for residents in Epping to use and will be supported by complementary civic plazas and activated retail on the site. The proposal also provides allowance for a future pedestrian connection from Carlingford Road to Boronia Park via the sites western boundary.

- **Active and public transport** – the site supports integrated land use and transport planning, being located within 200m of Epping train station, metro and bus network. It will reduce unnecessary vehicular trips to other competing retail centres including Top Ryde, Macquarie Park and Carlingford Court.

- **Minimal traffic impacts** – From a transport perspective, the proposed development does not raise specific issues with respect to impacts on the area or transport network nor unnecessarily affect existing land uses. It realises a definitive need for mixed -use developments within Epping and encourages a decrease in car dependency and uptake of sustainable transport.

  The proponent's traffic consultant (Stantec) liaised with TfNSW and Council to provide input on the proposed transport methodology/assumptions prior to lodgement and ensures gaps in

previous traffic analysis for Epping Town Centre are addressed in respect to this site-specific planning proposal.

- **Infrastructure and services** – there is adequate community and utility infrastructure to support the proposal.

1 Introduction

This Planning Proposal Report (**PPR**) has been prepared by Mecone Group (**Mecone**) on behalf of Canjs Pty Ltd (the **proponent**) to support a planning proposal to City of Parramatta Council (**Council**) for land at 53-61 Rawson Street, Epping (the **site**).

The site is the largest consolidated landholding (over 9,000m^2) on the western side of the station that can significantly contribute to the quality and character of the centre. It will contribute to the role of Strategic Centres to provide high-quality renewal and support a range of uses in a highly accessible location.

Specifically, the planning proposal will facilitate expansion of the supermarket offering with specialty retail and a minimum quantum of non-residential floor space of 1.5:1. This will be delivered in tandem with a highly permeable ground plane, with 50% of the site area forming public domain and open space, including a new generously sized park.

The planning proposal builds on several years of Council-led strategic investigations into the role and function of Epping to provide jobs and commercial floor space to reinforce its status as a Strategic Centre. There is a clear and consistent strategic line of sight to support the planning proposal and renewal of Epping into a vibrant and activated centre.

The planning proposal seeks the following amendments to *Parramatta Local Environmental Plan 2023* (**PLEP 2023**):

- Amend the height of buildings control to provide a maximum height ranging from RL 130, 197 and 206, equating to heights of approximately 112m and 123m and buildings of 33 and 36 storeys, and
- Introduce a requirement for a non-residential floor space ratio (**FSR**) of 1.5:1 through an additional local provision.

No changes to the underlying zoning or uses are proposed.

The planning proposal has been prepared in accordance with:

- Section 3.33 of the *Environmental Planning and Assessment Act 1979* (the **EP&A Act 1979**), and
- The NSW Department of Planning and Environment (the **Department**) *Local Environmental Plan Making Guideline* (the **Guideline**) dated August 2023.

The PPR contains the following information:

- A description of the site in its local and regional context,
- A statement of the objectives or intended outcomes of the proposed instrument (**Part 1**),
- An explanation of the provisions that are to be included in the proposed instrument (**Part 2**),
- Justification for the strategic and site-specific merit of the proposal (**Part 3**):
    - Relationship to the strategic planning framework,
    - Consistency with the relevant directions under Section 9.1,
    - Environmental, social and economic impacts,
- A summary of existing and proposed mapping (**Part 4**),
- Details of community consultation undertaken and future consultation requirements (**Part 5**), and

- An indicative project timeline (**Part 6**).

1.1 Proponent and project team

This application is supported by and should be read in conjunction with, the following specialist drawings and reports identified in **Table 1**, except where modified by supplementary technical reports or addendums submitted post lodgement.

TABLE 1 – SUPPORTING DOCUMENTATION

ITEM	AUTHOR	REFERENCE
Architecture, as updated via Addendum Architectural Report	Kann Finch	Appendix 1
Urban Design, as updated via Addendum Urban Design Report	Gyde	Appendix 2
Landscape Architecture, as updated via revised Public Domain Report	Arcadia	Appendix 3
Transport Impact Assessment, as updated via Addendum Transport Impact Assessment	Stantec	Appendix 4
Flood Assessment, as updated via Addendum Flood Letter	GRC Hydro	Appendix 5
Economic Impact Assessment, as updated via revised Economic Impact Assessment	Atlas Urban Economics	Appendix 6
Community Infrastructure, as updated via Community Infrastructure Letter	CRED Consulting	Appendix 7
Ecologically Sustainable Development	Stantec Australia	Appendix 8
Wind, as updated via revised Wind Assessment	Windtech	Appendix 9
Electrical and Hydraulic Services Infrastructure Report	Stantec Australia	Appendix 10
Preliminary Site Investigation	Douglas Partners	Appendix 11
Council and agency correspondence	Council and State agencies	Appendix 12
LEP Mapping, as updated via updated height map	Mecone	Appendix 13
Rapid Design Review	Space Syntax	Appendix 14
Podium Concept Report	Edge Design Studio	Appendix 15
Landscape concept strategy and Connecting with Country narrative	Aracdia	Appendix 16

2 Background

The Planning Proposal builds on several years of strategic investigations led by Council, with the proponents site forming a key feature in shaping the role and function of Epping and to reinforce its status as a Strategic Centre.

2.1 2011 Epping town centre study

The Epping Town Centre Study 2011 was jointly initiated by the then Department of Planning and Infrastructure, Hornsby Shire Council and Parramatta City Council. The report explored the potential for the centre to accommodate new growth given its important strategic location. In summary, the report recommended:

- The town centre could support an additional 3,000-4,000 new dwellings over a 20 year period, most of these new dwellings in the town centre core,
- Built form in the core to be 2-4 level podiums at the lower levels for retail/ commercial with taller residential built form up to a total of 22 storeys above,
- Intensification areas close to the core for residential apartments 2-6 storeys in height,
- Improved public domain, and pedestrian and cycle connections through the centre, and
- Road and intersection upgrades.

FIGURE 4 – EPPING TOWN CENTRE STUDY
Source: Department of Planning and Infrastructure

2.2 2011 Study review

The Department engaged Architectus to peer review the 2011 study following the NSW Government announcement regarding the North West Rail Link. The peer review supported the key recommendations in the 2011 Study including:

- Concentrating residential growth close to the railway station
- Built form in the form of tall, slim towers above street level podiums
- Improved public domain and pedestrian and cycle connections.

Some key differences to the recommendations in the 2011 Study included:

- Potential for increased height and FSRs close to the station without significant amenity impacts
- Increased setbacks of towers in Oxford Street to preserve the street character
- Greater options for types of residential flat buildings outside the core.

FIGURE 5 – EPPING TOWN CENTRE PEER REVIEW STUDY
Source: Architectus

In March 2014, Council made amendments to the DCP to ensure new DCP provisions corresponded to the new LEP controls which were adjusted following the outcomes of the Department's UAP Planning Report and Structure Plan.

2.3 2013 Oakstand competition entries

Oakstand held a masterplan design competition during November – December 2013. Participants included Grimshaw, KannFinch, CHROFI and Hassell. Grimshaw and KannFinch were selected as the competition winners and continued to assist Oakstand over the following year in their presentations and discussions to Council and the Department.

2.4 2014 Rawson Street, Epping masterplan

In May 2014, Architectus was engaged by the Department to prepare a masterplan for the amalgamated site area proposed in the Oakstand design competition. The report included a review of the Oakstand competition entries and a series of proposals for a recommended master plan.

2.5 Phase 1 Epping planning review

Studies undertaken in relation to Epping date back to Council's Phase 1 of the Epping Planning Review in 2017 and 2018. The Review concluded that since the 2014 Epping Urban Activation Precinct rezoning, new development in the B2 zone had progressively eroded the amount of commercial floor space (and jobs) in Epping.

The development pattern emerging from the 2014 rezoning was in the form of shop top housing with little floor space dedicated to employment generating uses (residential floor space at the expense of commercial floor space).

This form of development was seen by Council as inconsistent with the strategic vision of Epping as set out in State and local planning policy. As a result, the existing controls for Epping were seen as not fit for purpose.

2.6 Council planning proposal (PP-2021-3070)

Following extensive analysis undertaken since the Phase 1 Epping Planning Review, Council prepared a planning proposal to facilitate renewal and commercial floor space in Epping.

At the 29 September 2020 Local Planning Panel (**LPP**) meeting, the LPP was presented with three potential options to support the provision of commercial floor space in Epping Town Centre. These options comprised:

- **Option 1:** No change to planning controls and let market conditions dictate the commercial floor space achieved. Based on recent development trends, this may result in only ground floor retail being delivered. However, market conditions could change over time, or
- **Option 2:** Mandate a minimum amount of non-residential floor space within the current maximum FSR controls, or
- **Option 3:** Mandate a minimum amount of non-residential floor space in excess of the current maximum FSR controls.

The LPP determined that Option 3 be pursued in line with Council's recommendation and that a planning proposal be prepared. This was seen by Council to ensure no net loss/gain of residential potential. The proposed measure only allowed for additional floor space to achieve Council's strategy for provision of a minimum level of commercial floor space.

The planning approach under Option 3 was to ensure the provision of commercial floor space was viable to be delivered but not at the expense of residential to maintain the viability of urban renewal.

At the same time, it sought to rectify a long-standing mismatch in height and floor space in Epping, which has undergone ongoing clause 4.6 variations to height to maximise the full quantum of floor space available.

At a 15 December 2020 LPP meeting, the LPP was presented with proposed planning proposal provisions that sought to give effect to Option 3. The LPP supported the proposed provisions and determined that a planning proposal of this nature be formally prepared and forwarded to the Department to request the issuing of a Gateway Determination.

At the time, the site (subject of this planning proposal), benefited from PP-2021-3070 in the following ways:

- Maximum height of buildings – Increase from 48m to 80m, and
- Maximum FSR – Increase from 4.5:1 to 5.5:1 with a 1:1 non-residential requirement.

2.7 Department assessment

On 12 October 2021, the Department recommended that the proposal not proceed. The following reasons were stated in the Gateway Determination report:

- It remained inconsistent with three ministerial directions (heritage conservation, remediation of contaminated land and planning for bushfire protection),
- It was not considered to be the best means of achieving the intended outcomes,
- The traffic study did not align with the proposed provisions and could not be properly used to assess future traffic impacts associated with the planning proposal,
- No heritage studies were provided with nil analysis on a range of heritage matters,
- It did not contain sufficient detail to accurately assess a range of anticipated build form impacts, and
- It did not provide commentary on existing infrastructure.

Key to the Departments determination was the acknowledgment the proposal exhibited strategic merit, noting:

> *Whilst **the planning proposal is generally strategically aligned with relevant State and local plans**, the planning proposal has not demonstrated site-specific merit that the proposed amendments to the Parramatta LEP 2011 and Hornsby LEP 2013 are appropriate to proceed at this time. **The Department considers that a more refined and targeted approach may be more appropriate**.*
>
> (our emphasis added)

Overall, the Department considered the planning proposal had strategic alignment, but lacked sufficient information to support its progression. It noted provisions, which specifically targeted select sites as wielding development potential could better achieve the intended outcome. The site was strategically located and was the largest site in the entire planning proposal.

Following these outcomes, the proponent has engaged with Council, with the intention to prepare this planning proposal that reflects the refined and targeted approach envisaged by the Department.

Furthermore, the intention of the proponent is to fully address any concerns raised by the Department in their assessment of the centre-wide planning proposal.

2.8 Pre-DA and Design Excellence Advisory Panel

During the Department's evaluation of PP-2021-3070, the proponent engaged extensively with Council's Development Assessment (**DA**) and Design Excellence Advisory Panel (**DEAP**) in late 2021 early 2022 to prepare a masterplan generally consistent with Council's planning proposal.

The masterplan, which relied on PP-2021-3070, demonstrated the site could deliver:

> *Construction of 3 x 17 – 30 storey mixed use buildings above 2-3 storey podium with below ground supermarket/retail, ground level retail (6,500sqm), ground and first floor commercial (3,100sqm), 420 residential apartments, 5 storey basement (542 parking spaces), publicly accessible open space and vehicular access from Rawson Street.*

The main difference between the proponent's masterplan and PP-2021-3070 was the redistribution of height to produce tower variation across and deliver improved environmental amenity. Council's proposal introduced a blanket 80m (approx. 20 storeys) height across the site, while the proponent's concept increased heights up to 30 storeys on one building and reduced heights to 17 storeys on another.

Key drivers of the proposal included a new full-line supermarket as a key retail destination. The masterplan was developed in concert with Council's planning proposal and input from the DEAP to guide many of the built form outcomes.

A comparison between the two built form outcomes is provided in **Figure 6**.

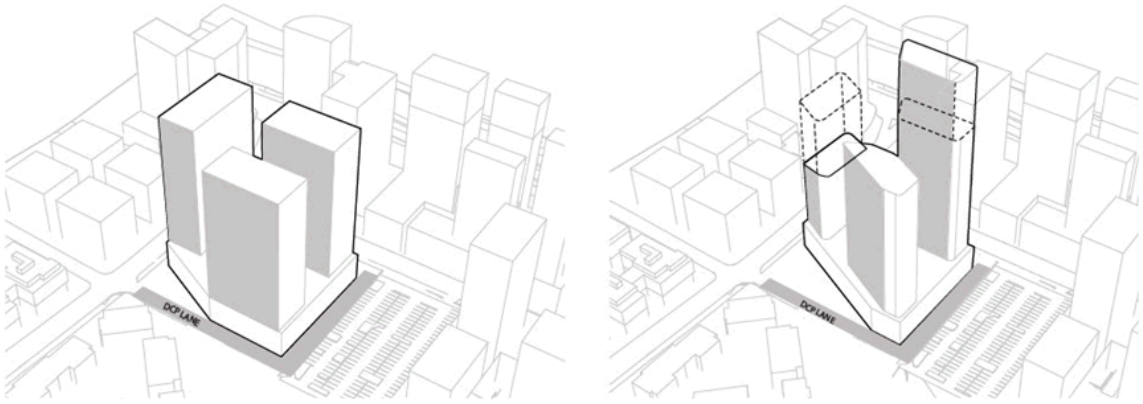


FIGURE 6 – COMPARISON OF COUNCIL PROPOSAL (LEFT) AND MASTERPLAN (RIGHT)
Source: Kann Finch

The proponent conducted three DEAP workshops and a number of Pre-DA meetings to progress the design. The final DEAP workshop on 20 January 2022 noted the following:

> ***The general massing and building heights are considered acceptable** however the Panel suggested alternative solar study software. The proposed materials and colours of the towers*

were not addressed in detail and the Panel assumes the next presentation will provide further architectural resolution.

(our emphasis added)

Overall, the proponent has undertaken extensive engagement with Council officers and the DEAP over two years, which has culminated in the form of the proposal, which is generally consistent with the outcomes envisaged in PP-2021-3070.

Notwithstanding the outcomes of PP-2021-3070, which did not receive a Gateway Determination from the Department, the proponent has advanced its plans for a built form outcome that is capable of achieving strategic and site-specific merit and advancing the Department's recommendations for a targeted approach.

2.9 Scoping study meeting

On 19 December 2022, the proponent met with Council's strategic planning team to go through a scoping study submitted for the proposal. A summary of the comments are provided below:

- Urban design – note discussions held earlier prior to the preparation of the scoping study and no further comments provided in relation to this matter as a result of reviewing the scoping study.
- Building height – an analysis of the heights to be achieved under the planning proposal will need to be detailed to clearly articulate the public benefit outcome and compliance with residential floor area for the site under current controls.
- Traffic – there is a road widening reservation along Carlingford Road to allow 3 eastbound lanes in Carlingford Road between Ray Road and Beecroft Road Epping (Lot 70 and 71 DP 1226431). There was an additional request that the traffic impact assessment consider the additional east bound lane as a result of the proposed road widening.
- Affordable housing – review the Council meeting from December 2022 to hear discussions regarding a recent Planning Proposal at Melrose Park and their response to the provision of affordable housing. The applicant noted that Melrose Park sought increased residential FSR and a change of land use to facilitate additional density. This application does seek to change the land use and is not seeking to increase residential FSR.
- Voluntary planning agreement – Consideration of Council's *Community Infrastructure Plan* (CIP) and *Sports Strategy and Action Plan* should be review ahead of the preparation of a letter of offer needed to support the submission of a planning proposal.
- Consultation with agencies – Council will be packaging the scoping study and other documentation to the Department and Transport for NSW (**TfNSW**) and Sydney Water.

A copy of the comments is provided in **Appendix 12.**

2.10 Engagement with TfNSW

Prior to preparation of the traffic analysis, the proponent's traffic consultant (Stantec) liaised with TfNSW and Council to provide input on the proposed transport methodology/assumptions. This includes requests for concurrence on traffic generation rates and traffic growth assumptions.

The prepared Transport Impact Assessment (**TIA**) ensures gaps in Council's previous traffic analysis for Epping Town Centre are addressed in respect to this site-specific planning proposal. A summary of correspondence with stakeholders is detailed in Table 1.2 and Appendix A of the TIA (**Appendix 4)**.

2.11 Post lodgement refinements

On 22 December 2023, Council provided a formal Request For Information (**RFI**). The RFI provided a detailed review from Council's urban design team in relation to the proposed masterplan and massing of the planning proposal.

Council's massing included a maximum FSR of 5.5:1, 4-5 storey podium heights and 2 consolidated tower forms configured in a perpendicular arrangement with the tallest form located to the north along Carlingford Road. An extract of Council's preferred massing is provided in **Figure 7**.

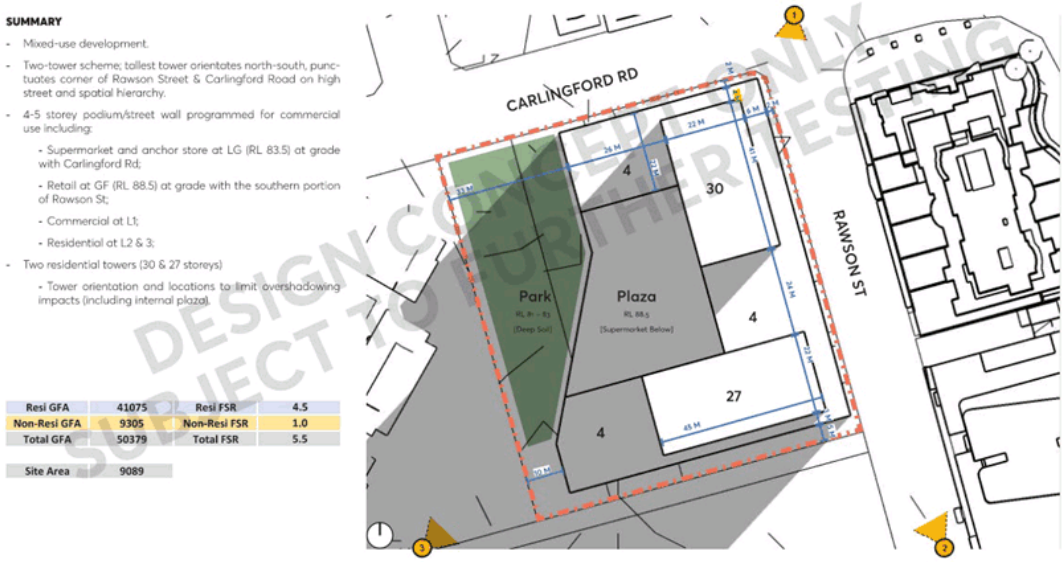


FIGURE 7 – COUNCILS PREFERRED MASTERPLAN (DECEMBER 2023)
Source: City of Parramatta Council

The proponent responded to Council's letter on 23 February 2024. The letter provided a response to all RFI items (including updated technical reports), with most capable of being addressed and further resolved in future application stages.

Shortly after issuing the RFI, the proponent embarked on an extensive and collaborative consultation process with Council to align expectations for the planning proposal. A summary of the meeting process and outcomes is discussed below:

6 MARCH 2024

The proponent outlined its views on the two tower massing prepared by Council and outlined next steps to work constructively on additional massing options to ensure the future uses on the site and intended outcomes of the proposal could be suitably accommodated. This further testing used Council's massing in the 22 December 2023 RFI as the basis for exploring further design outcomes.

It was acknowledged the site could potentially accommodate an additional 0.5:1 of non-residential FSR to support its role as a key mixed-use destination and facilitate additional opportunities that could not be realised within the broader town centre due to the range of constrained sites (lot fragmentation, heritage, strata titled, sites with DA approvals and already under construction).

20 MARCH 2024

The proponent met with Council to discuss 4 built form options. These options built upon Council's initial framework for the site including investigating the capacity for an additional 0.5:1 of non-residential FSR within the podium. Options also considered 3-4 storey podiums in lieu of the 4-5 storeys proposed by Council, altered orientation of towers and redistributions in height. The options included:

- Option 1 – Council's preferred massing
- Option 2 – Same as Option 1 without residential podium,
- Option 3 – Same as Option 2 with additional 0.5:1 non-residential FSR, and
- Option 4 – Proponents preferred option with additional 0.5 non-residential FSR.

5 APRIL 2024

Council wrote the proponent maintaining its preference for a 4-5 storey podium and two towers generally aligned with the 22 December 2023 RFI, with the tallest tower aligned north-south at the corner of Rawson Street and Carlingford Road. In its feedback Council also indicated support the provision of an additional 0.5:1 FSR of non-residential, resulting in additional height from their original submission of up to 35 and 32 storeys.

A summary of Council's preferred massing is provided in **Figure 8** below.

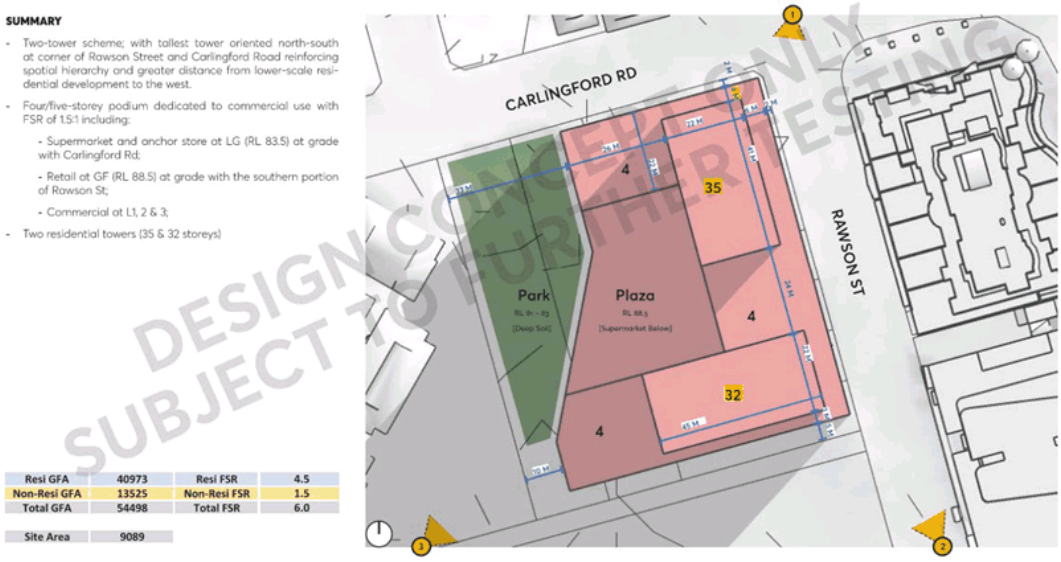


FIGURE 8 – COUNCILS PREFERRED AND REFINED MASTERPLAN (APRIL 2024)
Source: City of Parramatta Council

10 APRIL 2024

Council and the proponent discussed Council's preferred massing for the site (**Figure 8**). The proponent outlined additional refinements to the massing to be in a position to support amendments to the planning proposal.

Council indicated that a site-specific DCP would need to be drafted and included as part of Council's reporting processes. A site-specific DCP has been workshopped with Council and establishes the built form and public domain parameters for future DAs on the site.

The DCP provides clarity on a number of nuanced built form controls that respond to the unique setting of the site including:

- **Site layout** – establishing a site plan that dictates the future location of built form, streets and public domain,
- **Open space and public domain** – setting out the quality and character of the internal plaza and publicly accessible open space area in the north western corner of the site,
- **Service lane off Carlingford Road for service vehicles** – this will minimise site ingress/egress off Rawson Street and be supported by appropriate design treatments and flood control measures,
- **Setbacks** – these are more consistent with the current DCP controls for Epping Town Centre than what was originally submitted, with bespoke controls now respond to its prominent corner location at Carlingford Road and Rawson Street and site constraints,
- **Building height** – establishing a height in storeys control for built form to correspond with the proposed LEP height control including desire for a 4-5 storey podium but to allow opportunity to explore a 3-4 storey podium subject to detailed design and maintaining the street wall,
- **Floor to floor heights** – to meet NCC requirements, structure and servicing input, falls within the slab to accommodate populace domain elements and transfer structures,
- **Tower length** – allowing a tower length of 45m to support residential GFA within the tower forms and within the maximum height control, and
- **Footprint size** – capping tower footprints to 990m^2 (inclusive of GFA, balconies and terraces) to correspond to the tower length control and allow residential GFA to be distributed into two tower forms.

It is anticipated that the site-specific DCP will be refined through the rezoning process to respond to any changes to the planning proposal as needed.

The proponent agreed to the amendments to the masterplan and massing configuration consistent with Council's preferred approach with two towers of 32 and 35 storeys (which was subsequently updated to 33 and 36 storeys based on taking storey height from the lowest point of the site and not the highest) and a total FSR of 6:1 (1.5 non-residential), subject to resolution and agreement of floor to floor heights to accommodate the supermarket other structural allowances.

On this basis, the proponent proceeded to update the planning proposal package and technical reports for resubmission.

17 APRIL 2024

Council and the proponent discussed expectations for the DCP, including allowing appropriate levels of flexibility to allow the design to evolve at DA stage, as well as allowing additional height to accommodate plant and lift overrun elements.

It was acknowledged that the site-specific DCP would need to be drafted in a manner that allows a 3-4 storey podium on the site and to provide an allowance of 3m of additional height for plant and lift overrun.

The proponent maintained its preference for an RL for the proposed height control, appreciating the significant fall across the site and the role it will play in fulfilling a number of aspirations under Council's strategic planning for the site. Following discussions with Council, the consideration of RLs is warranted and a sensible outcome.

SUMMARY OF ENGAGEMENT AND UPDATED PLANNING PROPOSAL

Overall, the engagement post lodgement highlighted a broad appreciation by both Council and the proponent of the nuanced nature of the site and its capacity to deliver a full-line supermarket and additional non-residential floor space to support the revitalisation of the western side of Epping as a key retail and mixed-use destination. The revised masterplan is provided in **Figure 9**.

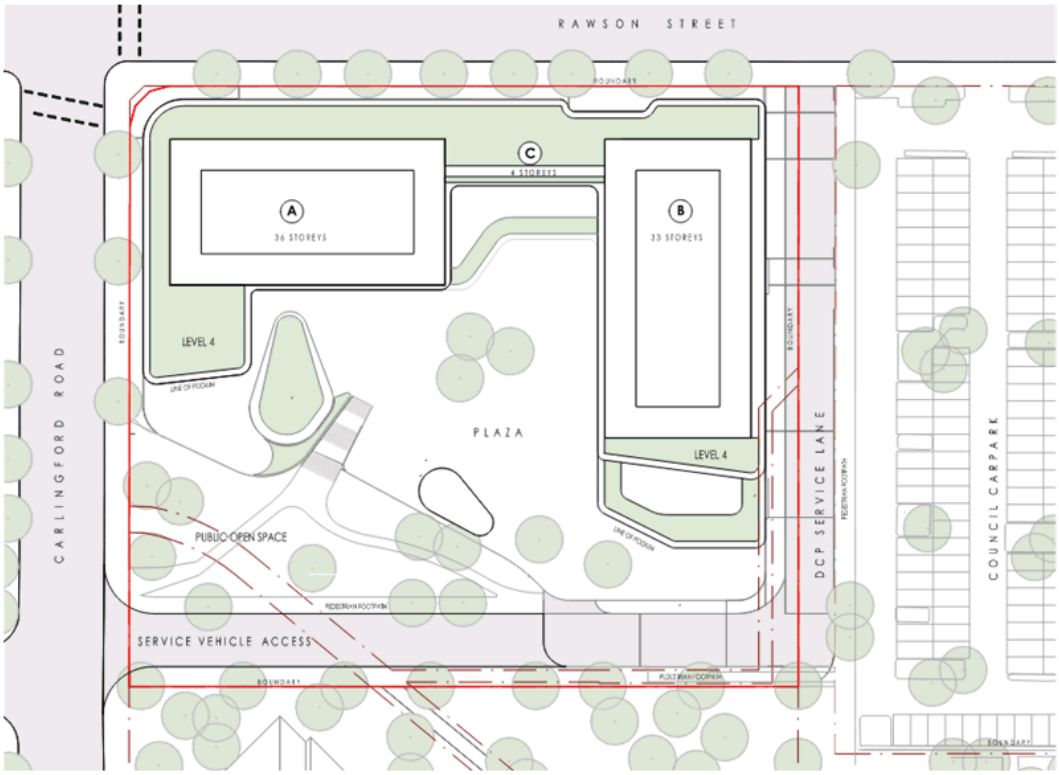


FIGURE 9 – REFINED MASTERPLAN
Source: Kann Finch

While the massing has evolved through the lodgement process, the intended outcomes continue to maintain a strong strategic line of sight of State and local planning policy and satisfy site-specific merit considerations.

This PPR and associated technical documentation have been updated to reflect the post lodgement consultation with the revised masterplan.

3 The subject site

3.1 Location and description

The site comprises seven (7) allotments legally defined as:

- Lots 4 – 7 in DP 19329,
- Lots 8 – 9 in DP 975578, and
- Lot 1 in DP 710711.

The site is rectangular in shape and comprises an area of approximately 9,089m^2. The site is developed with a single storey Coles Supermarket and a four (4) storey mixed use building with education and office related uses.

FIGURE 10 – SUBJECT SITE
Source: Nearmap

3.2 Summary of key features

A summary of the key site features and characteristics are summarised in **Table 2**.

TABLE 2 – SUMMARY OF KEY FEATURES

ITEM	DESCRIPTION
Address	53-61 Rawson Street
Legal Description	Lot 4 – 7 in DP 19329

ITEM	DESCRIPTION
	Lot 8 – 9 in DP 975578 Lot 1 in DP 710711
Total Area	Approx. 9,089m²
Street Frontage	Approx. 100m along Rawson Street, and Approx. 88m along Carlingford Road
Shape	Rectangular
Access	Access via Carlingford Road
Vegetation	Existing trees in the northwestern portion of the site occupied by an at-grade carpark
Structures	Single storey building containing Coles Supermarket and a four storey mixed use featuring various commercial and education uses
Slope	Fall of approx. 5 metres from the southeastern corner along Rawson Street to northwestern corner at Carlingford Road
Bushfire	The site is not bushfire prone
Flooding	Develin's Creek traverses the northwestern portion of the site

3.2.1 Environmental considerations

GRC Hydro have prepared a flood assessment for the site which has identified that the site is flood prone as a result of its proximity to Boronia Park Main Channel. The following flood map prepared by demonstrates the existing flood affectation of the site at 1% AEP event, which is noted to be isolated to the north-western portions.

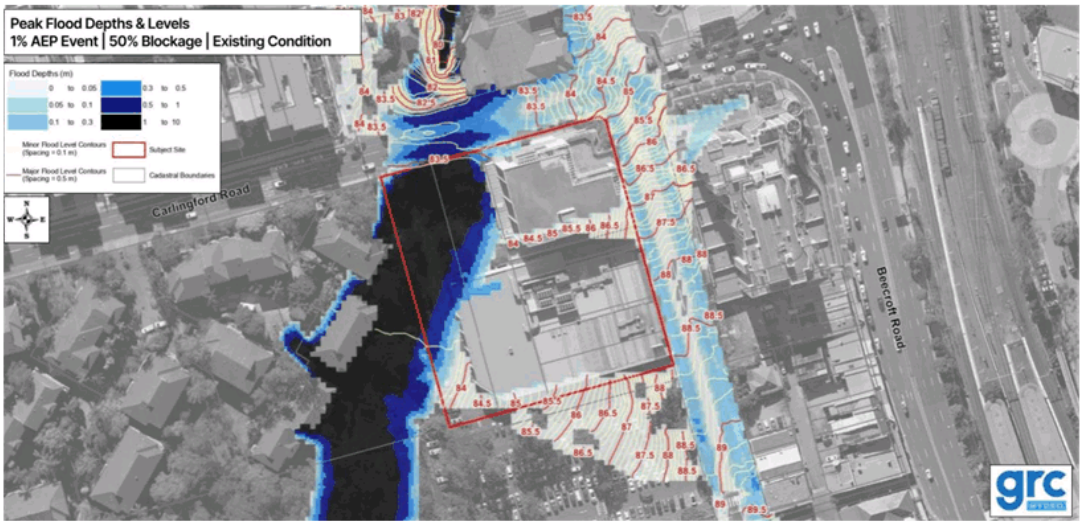


FIGURE 11 – EXISTING FLOOD AFFECTATION
Source: GRC Hydro

3.3 Surrounding context

To the north of the site is a public road (Carlingford Road) with Epping Baptist Church directly opposite on the corner of Carlingford Road and Ray Road (1-5 Ray Road, Epping).

To the north-east, 7-Eleven petrol station (246250 Beecroft Road, Epping) fronts three street elevations, being Ray Road, Carlingford Road and Beecroft Road, which is subject to a current DA.

To the east of the site is a public road (Rawson Street) with a seven (7) storey mixed-use development comprising ground floor and first floor commercial and retail spaces and upper level residential accommodation (74-76 Rawson Street Epping). The development addresses three street elevations, being Rawson Street, Carlingford Road and Beecroft Road, with commercial and retail premises addressed to each. Further to the east lies Epping Train Station and bus interchanges.

To the south of the site lies Crown land and a Council owned car park site, with car park access provided from the Rawson Street frontage.

To the west, established mid-rise residential complexes exist with access provided via Carlingford Road and Kent Street.

3.3.1 Opportunity sites review

Mecone and the project team have undertaken a detailed review of sites in Epping centre (the area considered in Council's planning proposal) to determine their development potential and capacity to deliver commercial floor space and facilitate urban renewal outcomes for Epping consistent with Council's objectives.

As demonstrated in **Figure** 11 below, there are limited opportunities for other sites to provide large format retail to the western side of Epping. Many sites are naturally constrained as a result of their small allotment sizes, fragmented ownership, heritage overlays, strata subdivision constraints and access and traffic arrangements, which reduces the ability to achieve feasible large format retail and commercial floorplates.

FIGURE 12 – SITE INVESTIGATION OF OTHER LOTS IN EPPING
Source: Kann Finch

The site is the single largest landholding and only viable opportunity capable of providing a full-line supermarket and a significant quantum of associated non-residential floor space. Whilst other sites have potential to amalgamate, the majority of the lots will not be able to accommodate for a full-line supermarket (1,080m^2 – 5,000m^2) and are based on multiple landownership patterns.

The site is a key urban renewal opportunity for Epping. It is the largest amalgamated site at 9,089m^2 and in single ownership, which is capable of achieving a retail core on the western side of Epping. Furthermore, it is in a highly accessible and convenient location, situated adjacent to Boronia Park and within 200m of Epping train station and bus interchange. It has the opportunity to provide high quality retail and public domain outcomes in close proximity to amenities, services and infrastructure.

3.3.2 Surrounding developments

Recent approvals within the Epping Strategic Centre assist in contextualising the locality and are summarised in **Table 3**.

TABLE 3 – SURROUNDING APPROVALS

ADDRESS	DESCRIPTION	APPROVAL DATE
48-54 Beecroft Road and 52-54 Rawson Street	21 storey mixed use building comprising 2 – 3 storey podium containing 5 retail tenancies and 18 storeys of shop-top housing above containing 130 apartments (46 x 1 bed, 70 x 2 bed and 14 x 3 bed) over 4 storeys of basement car parking; public through-site link; and demolition of existing buildings.	4 September 2019
245-244 Beecroft Road	Building envelopes for three towers up to 48m (15 storeys), an indicative maximum GFA of 38,700m2 for residential	20 July 2020

ADDRESS	DESCRIPTION	APPROVAL DATE
	and non-residential uses, approximately 432 dwellings (inclusive of 5% affordable housing, car parking spaces, vehicle and pedestrian access, communal and private open space areas and a through-site pedestrian link.	
43-53 Oxford Street	6 storey mixed use seniors living tower comprising 14 assisted living apartments, 20 care apartments, 60-bed residential aged care facility, 96 independent seniors living units and ancillary offices/retail; 155 car parking spaces in 4 basement levels; signage zones; landscaping; site amalgamation; public domain works; demolition of existing buildings and tree removal.	8 September 2020
37-41 Oxford Street	30 storey mixed-use development with a 4-storey basement'. On 24 December 2021, Stage 2 detailed design of the approved concept plan was lodged to Council under DA/1/2022, seeking approval for a '30 storey mixed use building comprising 2 storey commercial podium (retail unit, 60 children centre-based child care facility and commercial office space) and a shop-top housing tower above comprising 211 apartments, 6 basement levels providing 317 car parking spaces, landscaping and public domain works.	LEC Approved July 2023
24-36 Langston Place	27 storey mixed use tower comprising ground floor retail unit, first floor commercial office unit and 101 shop top housing units above, including 91 parking spaces in 4 basement levels; following demolition of existing buildings.	3 October 2018
59-77 Beecroft Road and 72 Rawson Street	Demolition of existing buildings and construction of a part 20 storey and part 22 storey shop top housing development comprising 126 residential units and 5,128m2 of commercial space over 5 levels of basement parking	Refused 1 March 2022
246-250 Beecroft Road, EPPING	15-storey mixed-use (shop top housing) development including 2 levels of basement parking, a medical centre and retail uses, and residential apartments.	Under Assessment Lodged 19/08/2022

3.4 Retail market context

The proponent engaged Location IQ to undertake a market potential assessment for the proposed retail component of the development. Location IQ determine that there is an under provision of supermarket offerings in Epping.

In particular, the report states:

- There are currently no other full-line (>3,200m^2) supermarkets within the primary sectors, with one smaller independent supermarket (1,000m^2) provided in the primary west sector at Carlingford. Typically, one full-line supermarket is supportable for every 8,000 – 10,000 persons, indicating that the combined primary sectors population alone could support up to 4-5 full-line supermarkets.

- The most significant proposed developments include Langston Place, which is planned to include a small (500m^2) IGA supermarket and Eastwood Shopping Centre approved to include a major redevelopment including an expanded Woolworths offer.

- Supermarket floor space provision across the main trade area, at 166m² per 1,000 persons is lower than the Sydney metropolitan benchmark (266m² per 1,000 persons). The provision within the combined primary sectors, at 99m² per 1,000 persons, is significantly lower than the benchmark level.

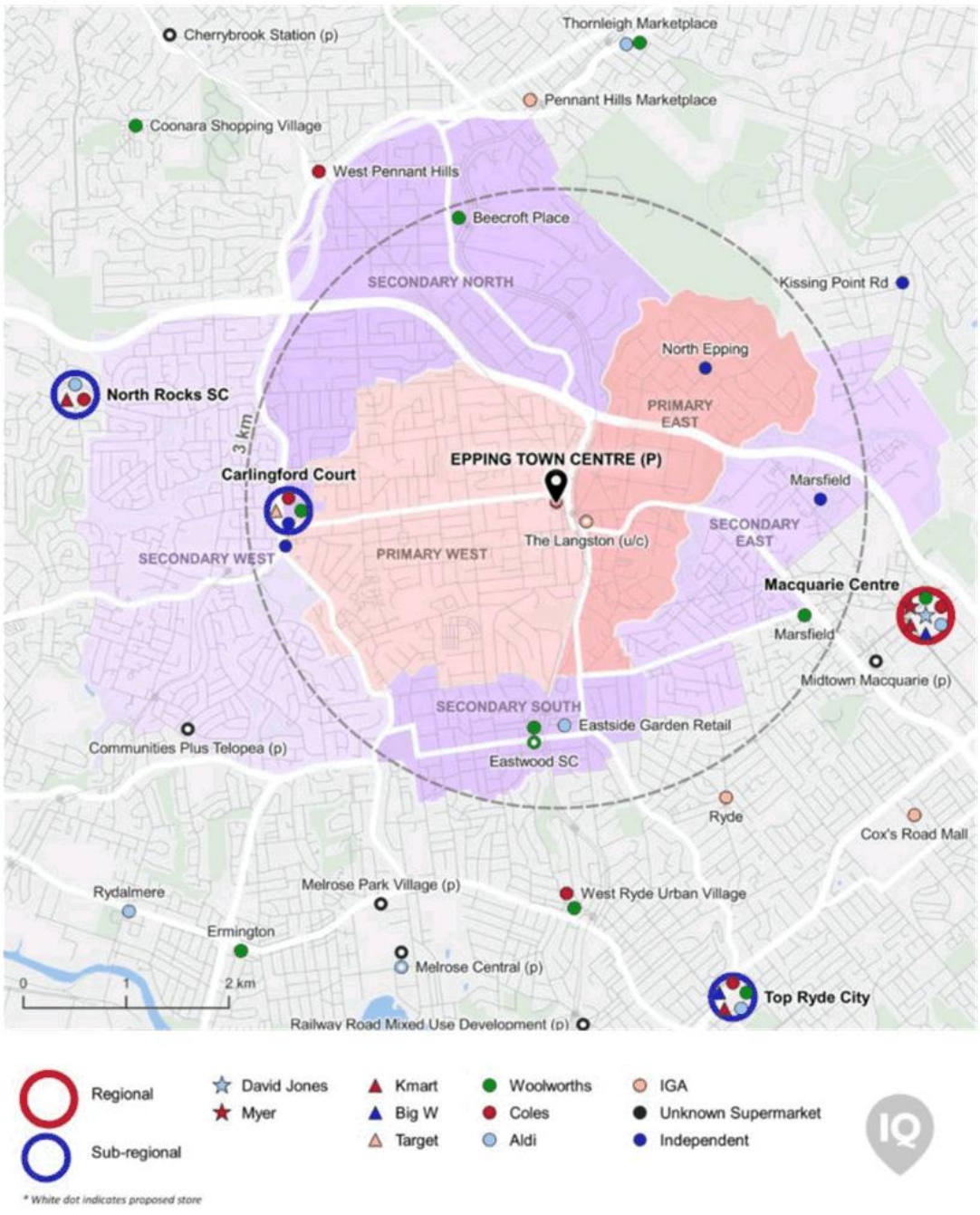


FIGURE 13 – SUPERMARKET COMPETITORS AND MAIN TRADE AREA
Source: Location IQ

In short, one full-line supermarket is typically provided for every 8,000 – 10,000 persons in established metropolitan areas. The combined primary trade sectors population is expected to reach almost 50,000 by 2026, which would indicate the potential to support 4-5 full=-line (>3,200m^2) supermarkets, with one currently provided (the existing Coles Supermarket at Epping).

On this basis, a new and revitalised full-line supermarket would create strong demand and will trade strongly. The planning proposal will facilitate an expanded retail offering on the site and fulfill a demand in Epping and the surrounding sectors.

In addition, an expanded supermarket would reduce vehicle trips from Epping centre to supermarket and retail offerings in Top Ryde, Carlingford Court, Macquarie Centre, Beecroft and North Rocks.

3.5 Strategic planning context

Epping is a designated Strategic Centre under the NSW strategic planning framework. The centre is located 9km northwest of Parramatta CBD and 4km west of Macquarie Park.

The centre is in a transport rich environment and includes Epping train station, metro station and bus interchanges. It is defined by a range of mid and high-rise residential and retail developments, with a series of low-rise retail uses fronting Beecroft Road and Langston Place.

3.5.1 Centres Review

A detailed review was undertaken of Strategic Centres across metropolitan Sydney and furthermore, centres along the northwest Metro corridor. The review looked at the following density controls across a number of comparable Strategic Centres including:

- Sydney Olympic Park – 149m (future metro),
- Chatswood – 140m (metro based),
- St Leonards and Crows Nest – 138 (metro based),
- Macquarie University – 130m (metro based),
- Blacktown – 100m,
- Liverpool 100m,
- North Ryde – 92m (metro based but not a Strategic Centre), and
- Hornsby 77.5m*, and
- Epping – 72m (metro based).

**Hornsby Town Centre draft Masterplan identifies up to 36 storeys adjacent to Hornsby Train Station. This would equate to approximately 111.6m based on 3.1m floor to floor heights.*

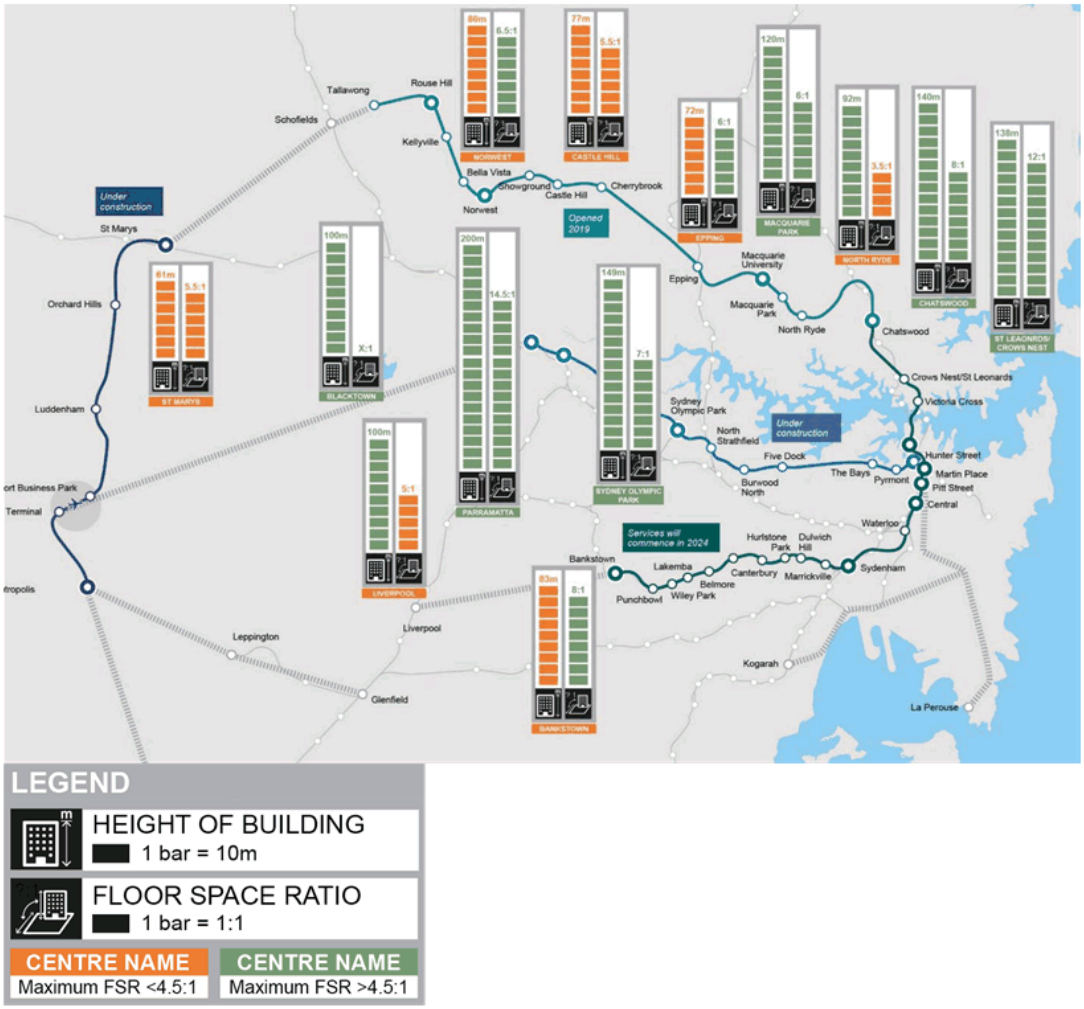


FIGURE 14 – STRATEGIC CENTRE ANALYSIS
Source: Mecone

Overall, the current height and FSR controls in Epping, which benefits from both heavy rail, metro and extensive bus network, are relatively modest. As a result of Epping's higher FSR (4.5:1) but lower height (72m), there has been a historical mismatch in density controls.

Many developments in the centre have been approved with significant clause 4.6 variations (in excess of 20%) to produce slender tower forms that extend beyond the existing height control to realise the full FSR available. All of these have been produced east of the train line at 22 Langston Place (RL 195.10) 37 Oxford Street (RL 192.50).

In reality, Epping contains several tower forms in excess of 100m despite having a maximum height limit of 72m. The emerging skyline in the eastern part of Epping is resulting in existing tower peaks/clusters on the northern and southern edges, whereas the western part of Epping has retained a lower scale.

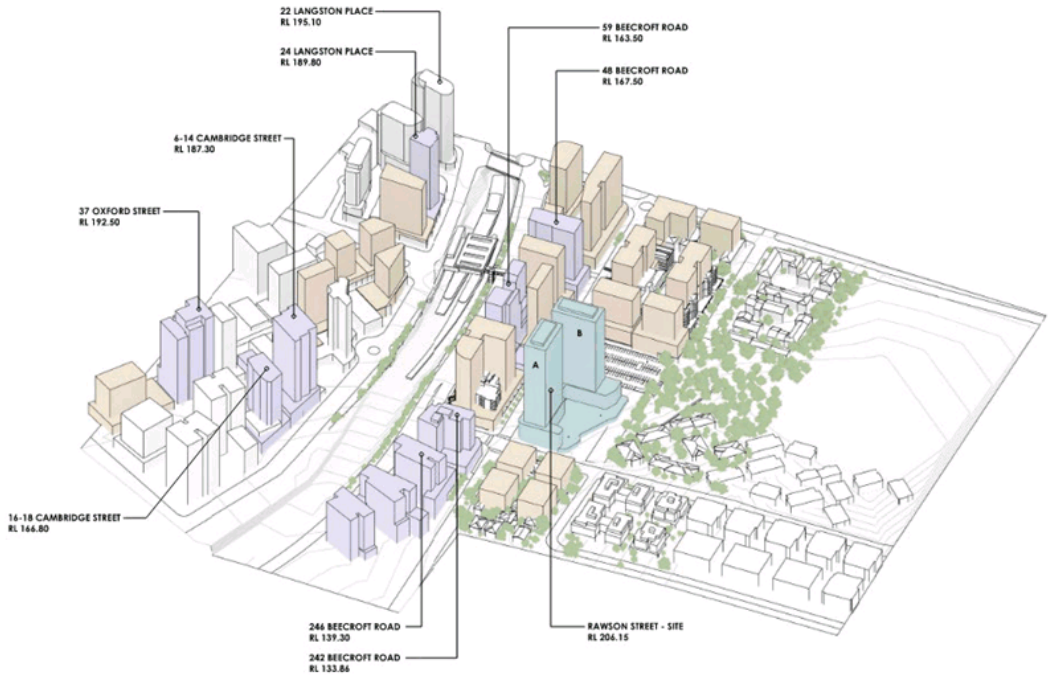


FIGURE 15 – URBAN PROFILE OF EPPING
Source: Kann Finch

3.5.2 Review of non-residential floor space in Epping

A non-residential floor space study was prepared by SGS Economics and Planning to support Council's review of planning controls in Epping. It is noted the study was produced before the Region Plan and District Plans, which at the time, Epping was considered a local centre. Key findings of the study include:

- Prior to the Priority Precinct process, Epping centre contained a relatively even mix of industries, providing local retail and services as well as employment opportunities across a range of industries.
- Recent development activity has seen the development of new residential floor space at the expense of existing office floor space that has been supporting this local employment. The quantum of retail floor space remains the same as existing sites are redeveloped.
- Epping continues to experience demand for retail and office floor space, however, development activity has seen commercial uses unable to access appropriate floor space to support their business.
- In light of this demand, forecast population growth, the size of infrastructure investment in the centre, Epping is considered to function as a sub-District centre, playing a more significant role than other nearby centres.

- In light of this sub-District function, over the next 20 years there is forecast demand for 13,000m^2 of retail floor space and 55,616m^2 of office floor space in Epping centre.

- Current patterns of development are unlikely to deliver the quantum of floor space required by 2036. A non-residential floor space is recommended as a means to deliver commercial floor space.

The planning proposal is therefore seen as a key opportunity site to provide non-residential floor space in Epping and support Council's vision for the centre in a targeted manner. An additional assessment of Epping's employment context is provided in the submitted Economic Impact Assessment (**EIA**) prepared by Atlas Economics at **Appendix 6**.

3.5.3 Regional context

The *Greater Sydney Region Plan* (**Region Plan**) is the metropolitan blueprint for Greater Sydney, anticipating the needs of communities by 'Transforming Greater Sydney into a metropolis of three cities'.

Epping is located within the Central River City, which is envisaged to grow substantially, capitalising on unprecedented public transport investment, city shaping infrastructure and inner-city living close to employment and commercial opportunities.

The Region Plan specifies where growth is anticipated, thus requiring Councils to prepare housing strategies to supply housing for the next 5 years (minimum targets). Furthermore, the Region Plan provides over-arching objectives to provide local infrastructure to support transport and develop a fine grain urban form and land use mix that is essential for improving the regions liveability.

The Region Plan identifies housing targets for the Central City District, which are identified as follows:

- A 0–5-year (2016-21) housing supply target of 53,500 dwellings, and
- A 20-year strategic housing target (2016-36) of 207,500 dwellings.

Central to the Region Plan is the need to deliver housing in line with infrastructure and identify opportunities for urban renewal. The Region Plan states 'Councils are to investigate opportunities for supply and a diversity of housing particularly around centres to create more walkable neighbourhoods'.

In this respect, the planning proposal is ideally located to facilitate urban renewal and strategic planning goals of delivering integrated land use and a 30-minute city.

3.5.4 District context

The District Plan identifies Epping as a Strategic Centre. The District Plan nominates the following expectations for Strategic Centres:

- High levels of private sector investment,
- Flexibility, so that the private sector can choose where and when to invest,
- Co-location of a wide mix of activities, including residential,
- High levels of amenity, walkability and being cycle-friendly, and
- Areas identified for commercial uses, and where appropriate, commercial cores.

FIGURE 16 – CENTRAL CITY DISTRICT PLAN
Source: Greater Sydney Commission

The planning proposal is consistent with the District Plan's vision for Strategic Centres. It ensures that growth is concentrated within an area that has efficient transport connections, i.e. Epping metro, train station and key bus interchanges, whilst a mix of land uses are provided, which will increase employment growth and opportunities in close proximity to housing and transport.

3.5.5 Local context

PARRAMATTA LOCAL STRATEGIC PLANNING STATEMENT (CITY PLAN) 2036

The Local Strategic Planning Statement *City Plan 2036* (**LSPS**) aligns with the Region Plan and District Plan by nominating Epping as a Strategic Centre.

It sets a target of providing 4,300 additional jobs and 8,910 dwellings in Epping by 2036, which is the only nominated growth precinct outside of Greater Parramatta to Olympic Peninsula (**GPOP**). Furthermore, Epping is only one of two Strategic Centres in the entire LGA. The LSPS provides the following role of a Strategic Centre:

Strategic Centres co-locate a wide mix of land uses (commercial and residential), have high levels of amenity, walkability and are cycle friendly.

Of critical importance, is the acknowledgement within the LSPS that the future Council will need to have:

> *Increased commercial floor space in Parramatta CBD, Olympic Park, Westmead **and Epping**.*

The following planning priorities and actions contained in the LSPS are applicable to the subject site:

- **Planning Priority 4**: Focus housing and employment in the GPOP and Strategic Centres; as well as stage housing release consistent with the Parramatta Local Housing Strategy (when endorsed),
    - Focus high-rise development in Parramatta CBD and Strategic Centres (Epping and Sydney Olympic Park) as shown on the Structure Plan Map,
- **Planning Priority 11:** Building the capacity of the Parramatta CBD, Strategic Centres, Local Centres and Employment Lands to be strong, competitive and productive, and
- **Action 69:** Advocate for the recommendations of Epping Town Centre Review (when completed) and implement the adopted recommendations.

Structure Plan:
Towards 2036

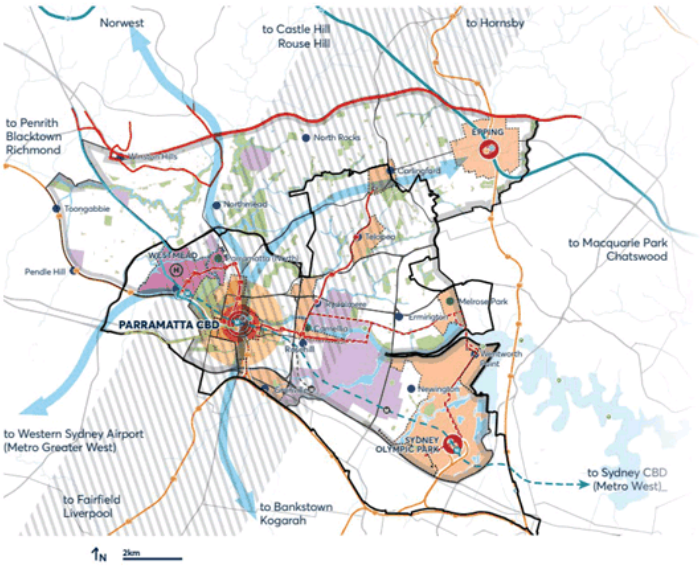


FIGURE 24 - STRUCTURE PLAN: AN OVERVIEW OF THE STRATEGY

Principles:

- Parramatta CBD: Metropolitan centre of business, culture and recreation.
- Focus development in the Greater Parramatta - Olympic Park (GPOP) area.
- Local character attributes for enhancement outside Growth precincts.
- Prioritise delivery of city-serving transport links (eg. Sydney Metro and Parramatta Light Rail Networks).
- Limit development along non-committed Mass Transit corridors.
- Tie development to the delivery of infrastructure.
- Prioritise connectivity to the Parramatta River.
- Build active connections between green spaces and centres.
- Ensure no net loss of employment lands.

LEGEND

- Greater Parramatta Metropolitan Centre
- Strategic Centre
- Local Centres
- Proposed Local Centres
- Growth Precinct
- LGA Boundary
- GPOP Boundary
- Sydney Metro Rail
- Potential Mass Transit/Rail Link
- Suburban Rail
- Light Rail (Stage 1)
- Light Rail (Stage 2)
- Ferry Stop
- Northwest Tway
- Parramatta-Liverpool T-Way
- M2 Express Bus Route
- Public Green Space
- Key Urban Services
- Health and Education
- Additional Housing (Growth Precincts)
- Council's preferred High Speed Rail Link
- Helicopter access to Westmead Health & Education Precinct

Metro West Line

- Identified Metro West alignment
- Stabling and Maintenance
- Service Facility: Stabling and maintenance
- Identified Station location

Notes:

- It is noted that the State Government has identified the Speedway as the preferred location for the stabling facility for Sydney Metro West. It is Council's view that an alternate location for the stabling facility should be investigated and identified.
- Dwellings in Camellia will be subject to the State Government's response to the Greater Sydney Commission's GPOP PIC recommendations.

Source: City of Parramatta

FIGURE 17 – PARRAMATTA LSPS STRUCTURE PLAN
Source: City of Parramatta

PARRAMATTA HOUSING STRATEGY

Epping Strategic Centre is identified as a growth precinct within the Parramatta LGA and is projected to provide 8,910 of dwelling growth under the Local Housing Strategy (LHS) by 2036.

Key findings of the LHS include:

- Residential growth is anticipated to be generated predominantly from Epping Strategic Centre,
- 4,420 dwellings have been completed, are near completion or planning proposals near finalisation within the Epping Strategic Centre with capacity for 4,490 dwellings forecasted for post 2021, and
- The proposed dwelling growth will be aligned with major mass transit upgrades under the Future Transport 2056 strategy, with Epping identified as a growth precinct with high opportunities, noting the transit rich environment of the centre.

The actions taken to implement the LHS are identified as follows, with the outlined actions aligning with the Central City District Plan and the LSPS actions:

- **L11** – Continue the delivery of already rezoned precincts including Epping and Site-Specific Planning Proposals to address C5-16 of CCDP (prepare local or district housing strategies that address housing targets), and
- **P17** – Finalise Epping Planning Review to address #42 of CCDP (Continue to review of planning controls for the Epping Strategic Centre in collaboration with State agencies).

Overall, there is a clear and consistent strategic line of sight to support the renewal of Epping into a vibrant and activated centre. The site is the largest consolidated landholding (over 9,000m^2) on the western side of the station that can significantly contribute to the quality and character of the centre. It will contribute to the role of Strategic Centres to provide high-quality renewal and support a range of uses in a highly accessible location.

3.6 Statutory planning context

3.6.1 Parramatta Local Environmental Plan 2023

PLEP 2023 is the principle Environmental Planning Instrument (**EPI**) that applies to development in the LGA. Key applicable provisions are outlined in **Table 4**.

TABLE 4 – PARRAMATTA LEP SUMMARY

CLAUSE	PROVISIONS
Land use	E1 local centre
Height of buildings	48m
Floor space ratio	4.5:1
Minimum lot size	The site is not subject to a minimum lot size
Heritage conservation	The site is not a heritage item, does not adjoin a heritage item and is not located within a Heritage Conservation Area (**HCA**).

	There are no heritage items located within the immediate vicinity.
Flood planning	Consent authority must consider development within the context of flood behaviour, impact on other properties, evacuation and risk to life.
Acid sulfate soils	The site is classified as Class 5
Earthworks	Earthworks will be required to enable excavation to facilitate the proposed development. This will be accompanied by a geotechnical report from a qualified specialist at DA stage.
Land reservation acquisition	The northeast corner of Carlingford Road and Rawson Street is identified for land reservation.
Ground floor development in zone E1	No ground floor that faces a street is to be used for residential accommodation.

3.6.2 Parramatta harmonisation development control plan

The status and future character of Epping has been recently reinforced in Council's harmonisation of the Development Control Plan (**DCP**).

Under the DCP, the site is located in 'Epping Central', which forms part of Epping Strategic Centre. The Centre Core accommodates higher density commercial, retail and residential development in the form of high quality, tall slim-line towers in the areas fronting Rawson Street and Beecroft Road (between Bridge Street and Carlingford Road).

FIGURE 18 – EPPING TOWN CENTRE PRECINCT MAP
Source: Parramatta Development Control Plan

The site, and planning proposal generally, is entirely consistent with the DCP's envisaged future character of Epping to deliver tall-slim line towers.

Following lodgement of the planning proposal, a draft site-specific DCP has been prepared that addresses feedback from Council's urban design team and responds to the unique nature of the site being a focal point for visitors and residents on the western side of Epping. The draft site-specific DCP will be read in conjunction with the current DCP but establish key built form parameters and location of public domain areas for future DAs.

4 The proposal

To inform the planning proposal outcomes, a design team along with other interdisciplinary consultants have prepared a preferred masterplan and architectural proposition for the site's renewal. The work that has informed these outcomes includes engagement with Council's DEAP, the urban design team following lodgement and the following studies:

- Flood analysis of Devlins Creek, prepared by GRC Hydro,
- Massing analysis of various built form options and architectural design, prepared by Kann Finch,
- Pedestrian movement analysis, prepared by Space Syntax,
- Landscape concept strategy and Connecting with Country narrative, prepared by Aracdia, and
- Urban design review and strategy, prepared by Gyde.

4.1 Summary of preferred masterplan

The overall outcome of this robust analysis and iterative design testing has been the preferred masterplan, which exhibits the best outcome for the site and Epping broadly. A summary of the key elements and vision of the masterplan include:

TABLE 5 – PROPOSAL SUMMARY

ITEM	DESCRIPTION
Land uses	Retention and expansion of the existing supermarket offer and supporting speciality retail, commercial and residential
Building form	2 x mixed use buildings supported by podium: Building A = 36 storeys (RL 206) Building B = 33 storeys (RL 197) Basement parking and loading areas
Gross floor area	Approx. Residential – 40,996m² = 4.5:1 Approx. Non-residential – 13,677m² = 1.5:1
Apartments	Approx. 406
Publicly accessible open space	4,600m² = 50%
Communal open space	3,167m² = 35%
Deep soil	1,230m² = 13.5%
Car parking	Complaint with the DCP

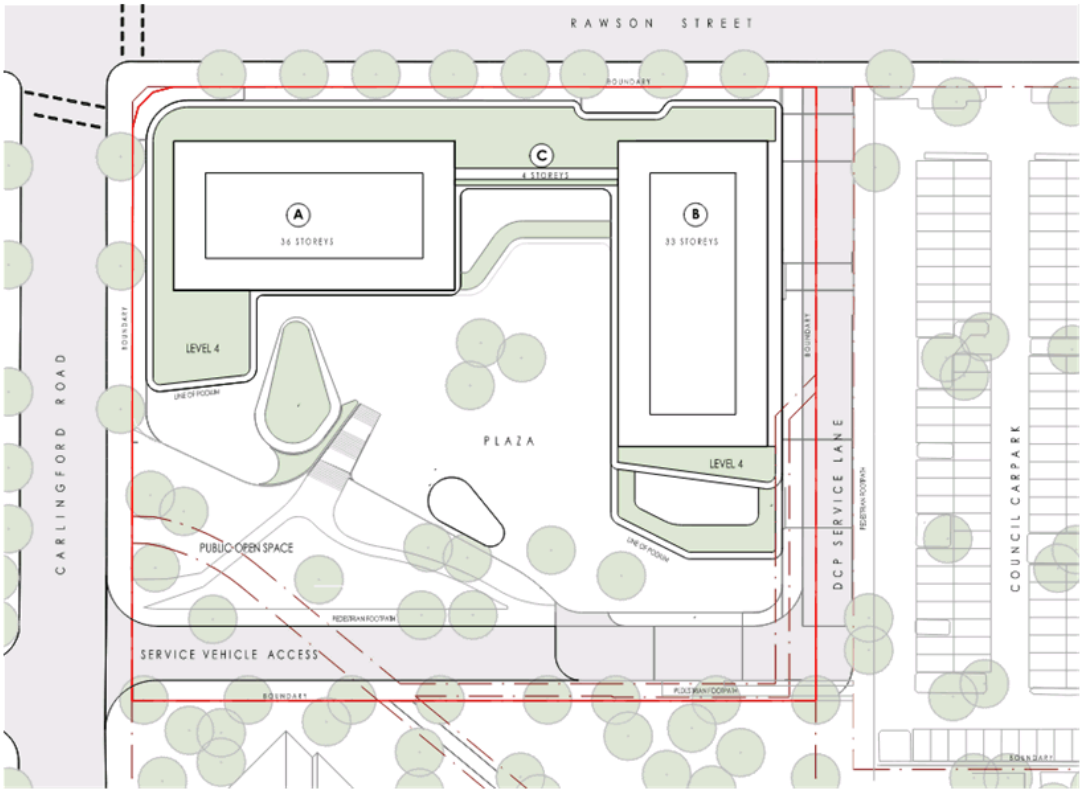


FIGURE 19 – PROPOSED DEVELOPMENT MASTERPLAN
Source: Kann Finch

The proposal seeks to create a true retail destination on the western side of Epping, consistent with Council's broader aspirations to prevent the erosion of commercial floor space in the centre. It remains the only opportunity site of a sufficient size on the western side to deliver true commercial floor space in tandem with open space and civic amenity.

4.2 Indicative floor plan layouts

To support the preferred masterplan, a series of detailed architectural plans have been prepared that demonstrates the capacity of the site to deliver upon the intended outcomes of the proposal. These include:

- Basement 1 Plan includes car parking and loading areas,
- Lower Ground Level Plan includes 3,100m^2 supermarket, 493m^2 mini major tenancy,
- Ground Level Plan includes 2,037m^2 of retail and commercial suites, residential lobbies, a DCP service laneway, a centralised retail plaza, a new park and public domain upgrades,
- Level 1 Plan includes 2,670m^2 of commercial,
- Level 2 Plan includes 2,380m^2 of commercial,
- Level 3 Plan includes 2,380m^2 of commercial,
- Level 4 Plan includes communal open space, communal room and residential apartments, and
- Level 5 Plan (Typical) includes residential apartments.

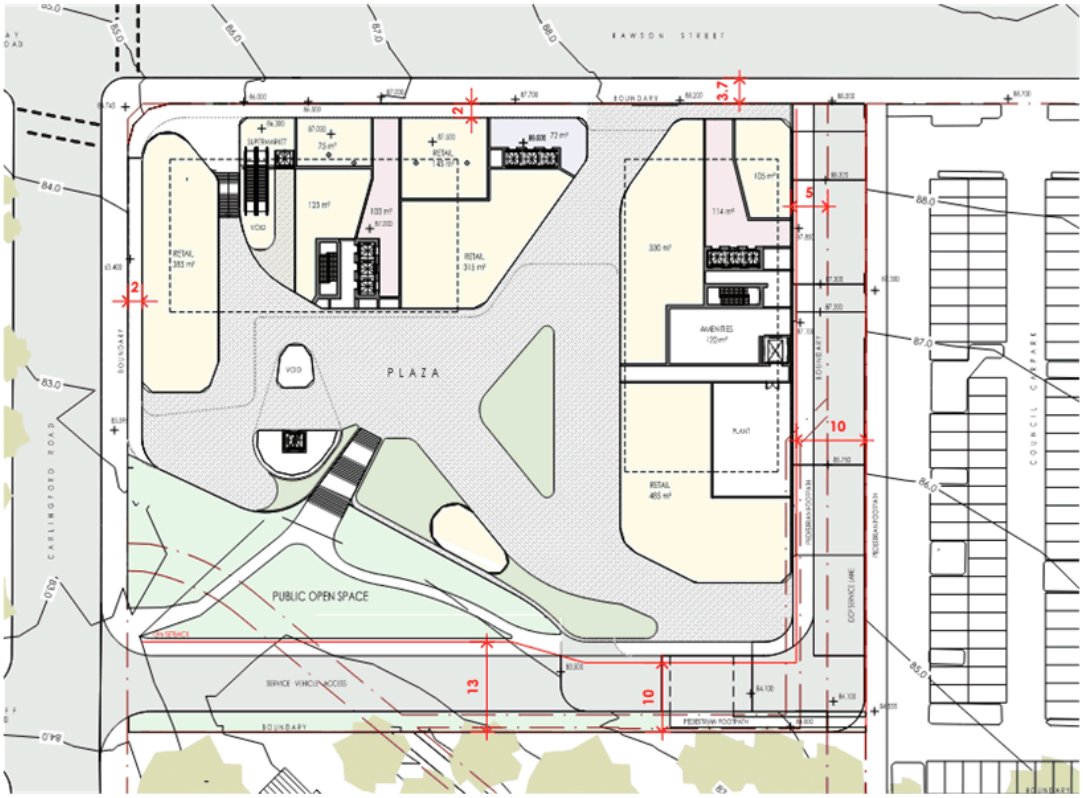


FIGURE 20 – GROUND LEVEL PLAN
Source: Kann Finch

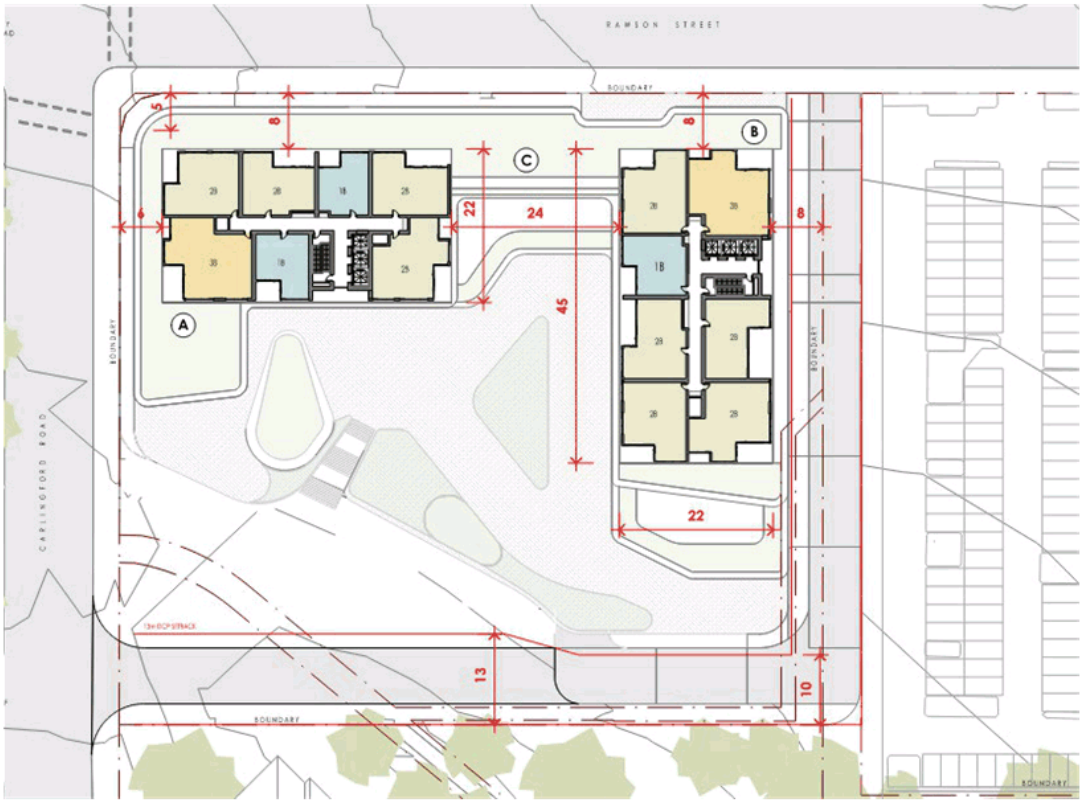


FIGURE 21 – TYPICAL LEVEL PLAN
Source: Kann Finch

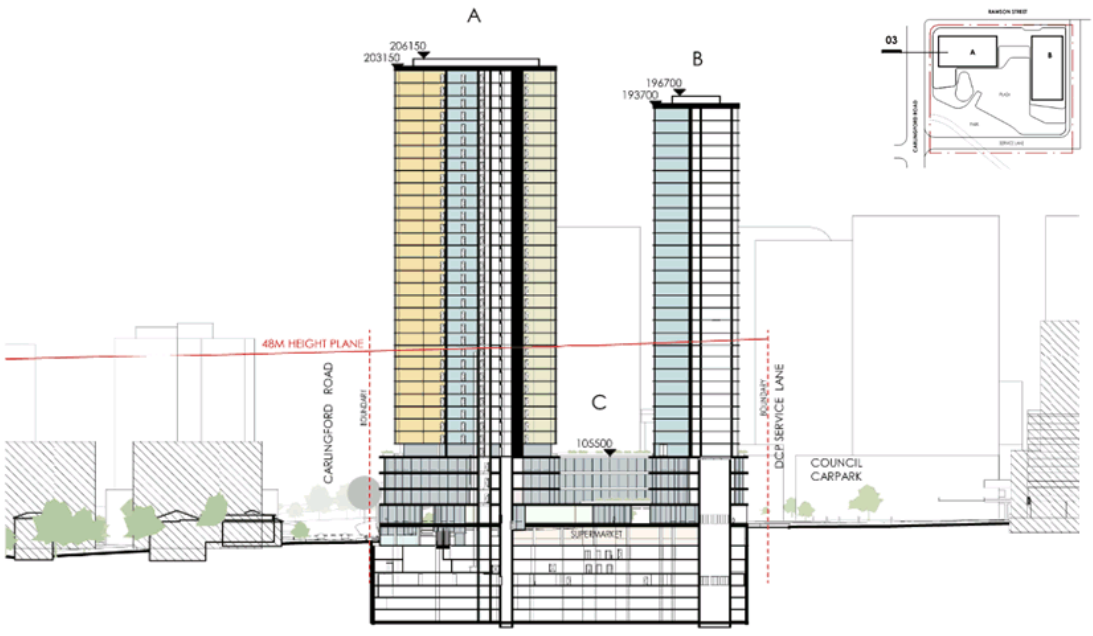


FIGURE 22 – EAST WEST SECTION

Source: Kann Finch

4.3 Built form and land use

The masterplan features a highly permeable podium along Rawson Street and Carlingford Road, which supports three residential towers of varying heights.

The distribution of height responds to the site constraints and has been carefully refined to significantly improve the visual presentation of the site and its interface with Epping more broadly. The setbacks proposed have been designed and sculpted to present slender frontages that minimise visual bulk exposure and produce fast moving shadows.

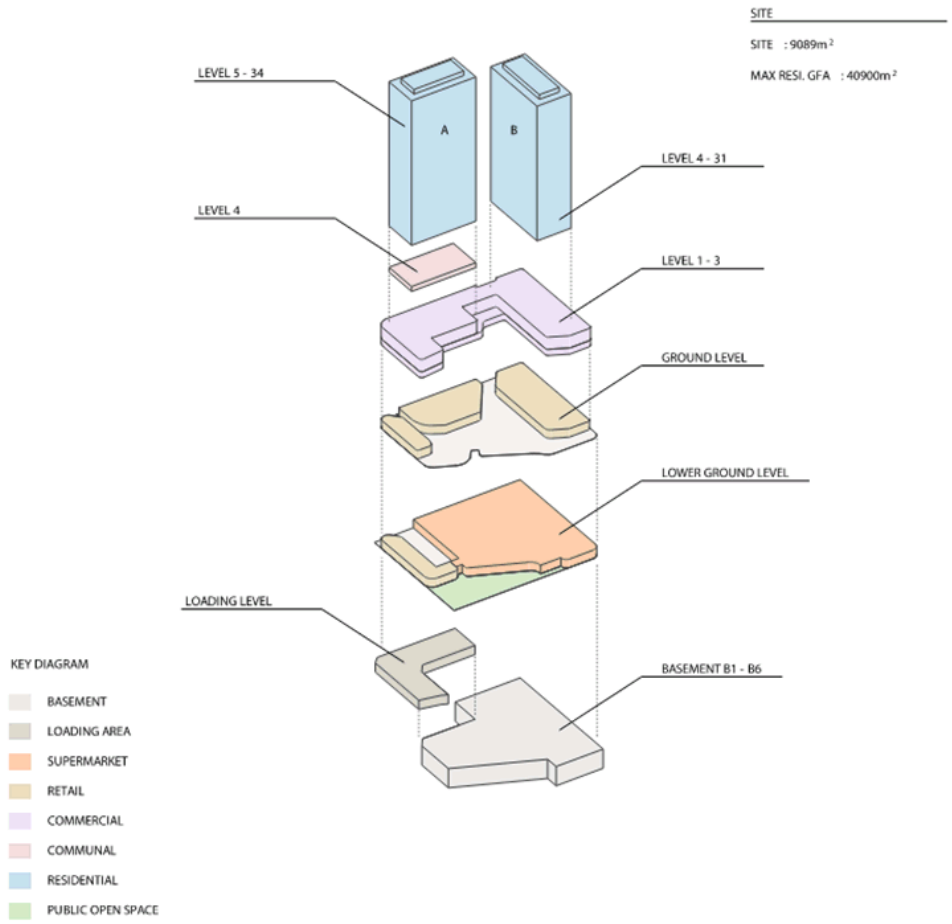


FIGURE 23 – BUILDING PROGRAM AND USES
Source: Kann Finch

4.4 Open space and public domain

The masterplan is supported by a detailed landscape strategy by Arcadia (**Appendix 3**) that supports the creation of a high amenity place and draws inspiration from the Devlins Creek Catchment. The landscape concept is underpinned by the following key moves:

- Introduce a landscaped frontage to Carlingford Road, integrating new open space into existing public areas,
- Create a sympathetic landscaped edge along Carlingford Road, matching the character of Boronia Gardens,
- Planting new street trees along Rawson Street,
- Enhance the central retail atrium with integrated landscaping, improving visual appeal and creating a sense of place,
- Provide landscape screening and deep soil areas along the western boundary to visually screen neighbouring residential development,
- Develop a diverse native landscape setting in the northwest corner, including a bush play zone and water element, and
- Design high-quality landscaped communal open spaces above the podium for residential apartments.

FIGURE 24 – PUBLIC DOMAIN CONCEPT
Source: Arcadia

A key element of the masterplan is the creation of 50% publicly accessible domain areas, which includes the provision of a generous park (1,230m^2) in the northwestern corner of the site. The landscape strategy prepared by Arcadia depicts a range of active and passive uses for this space including bush play zone, lookout, playful seating elements and native plantings.

Overall, the design team has carefully considered the needs of the broader community to create a true retail and civic destination for local residents.

4.5 Movement and access

The DCP requires all vehicular access to occur along the new southern laneway, providing the interface to Council's car park. For this portion of the site, the layout of the service laneways were designed in consultation with Council, to achieve a site a site access arrangement and an interface which is compatible with Council's vision for the site and the neighbouring car park.

As described earlier, the flooding analysis undertaken by GRC Hydro confirms the western laneway in Council's DCP is flood affected and is therefore not suitable for vehicular access in flood conditions. This does not preclude the potential to explore access solely for delivery vehicles via the western laneway with appropriate flood management devices to remove delivery vehicles from Rawson Street, in any future DA. This would represent an optimal outcome from a built form perspective, allowing for the separation of vehicle uses and improved pedestrian safety in Rawson Street, with service vehicles entering and exiting via Carlingford road during normal conditions.

We note following lodgement, the approach for allowing service vehicular access via Carlingford Road has been considered suitable. A site-specific DCP control is proposed to allow this to occur subject to demonstrating appropriate safety and flood control measures at this location.

Given the significant peak pedestrian traffic in Rawson Street, this outcome is seen as highly desirable. Effective flood management devices such as warning lights boom gates can be activated based upon an early warning system. In a flood event service vehicles would enter and exit via Rawson street. In the event of a significant flood event, the proposed flood gate to the loading dock entrance would be activated preventing all vehicular movements to and from the site.

The planning proposal is supported by a comprehensive TIA at **Appendix 4**, which describes the proposals access arrangements and parking provision.

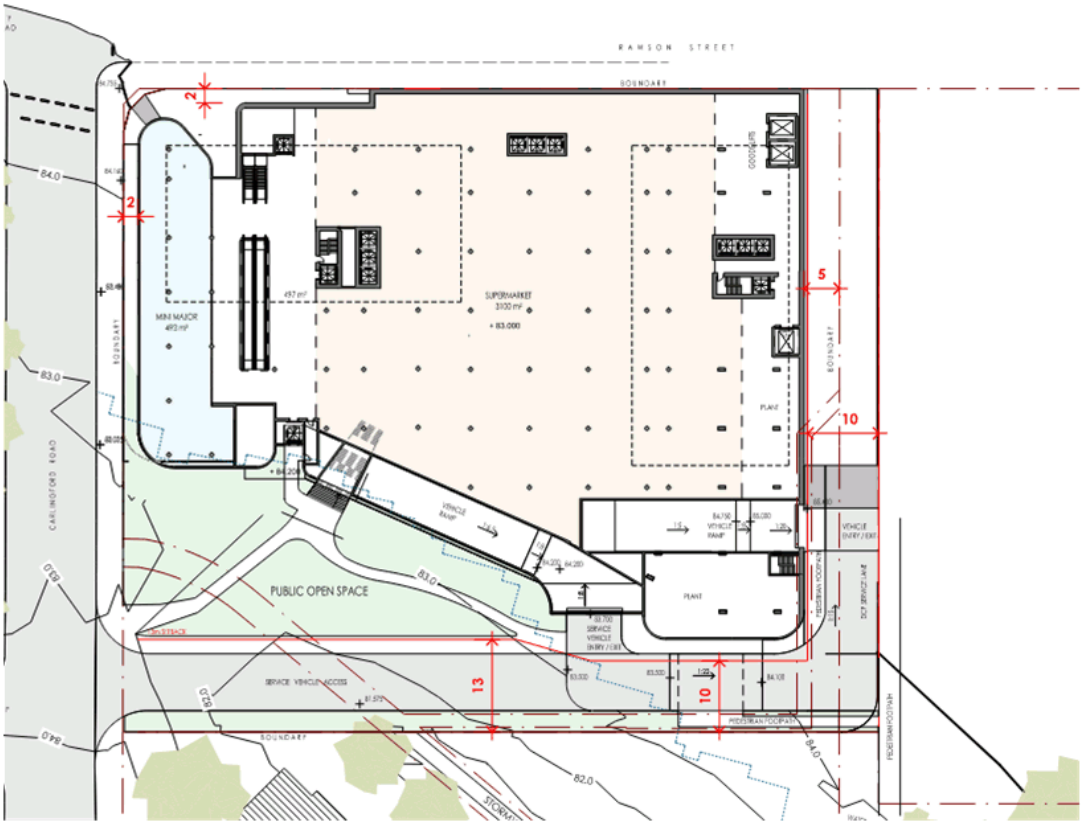


FIGURE 25 – LOADING AND ACCESS PLAN
Source: Kann Finch

4.6 Summary of community benefits

The planning proposal is supported by a Community Infrastructure Assessment prepared by Cred Consulting is provided at **Appendix 7**. The proposal offers a mix of commercial and community benefits in a highly accessible location supported by existing infrastructure and an integrated transport network (express bus, heavy rail and Metro).

Community benefits include:

REVITALISED SUPERMARKET AND RETAIL OFFERING

The proposal will provide for a new and revitalised full-line supermarket 3,100m^2 which is to be supported by new speciality retail floor space (~2,530m^2). The provision of approximately 5,360m^2 of non-residential uses will help create a retail destination on the western side of Epping.

PUBLICLY ACCESSIBLE OPEN SPACE

A new publicly accessible open space on the ground floor is proposed for the site, including a new park of 1,230m^2 and 4,600m^2 of publicly accessible open space in total. This will deliver improved site permeability, safety and security and activation of Rawson Street and Carlingford Road. Proposed features of the new park may include play elements that serve both children and adults such as climbing mounds, social lawn, bridge crossing and interpretive art.

COMMERCIAL EMPLOYMENT OPPORTUNITIES

The proposal will include 7,430m² of commercial floor space and 5,360m² of retail floor space, which will greater employment opportunities within Epping Town Centre.

COMMUNAL SPACE FOR RESIDENTS

The planning proposal includes a new communal green open space for residents of 1,405m². Additionally, 532m² of communal space is proposed adjoining the level 4 communal open space area. The communal space will be available to residents of the proposed development and may include a multi-purpose room, co-working space, music room or gym.

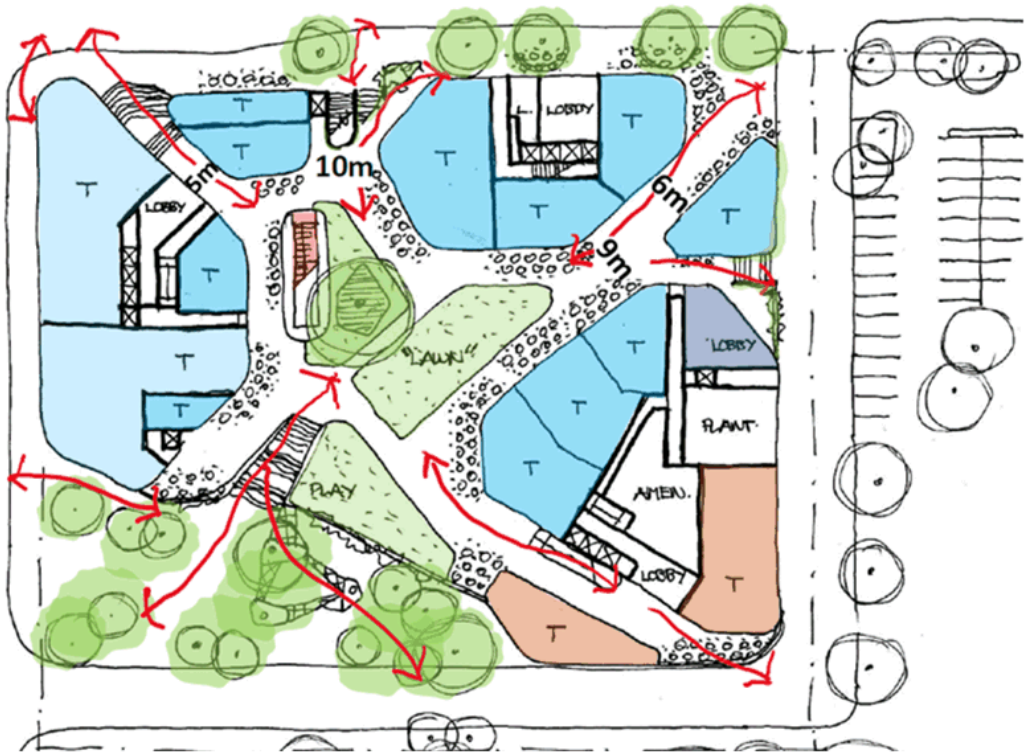


FIGURE 26 – PUBLIC BENEFITS SUMMARY
Source: Kann Finch

5 Part 1 – Objectives and intended outcomes

The planning proposal seeks to facilitate a high-quality mixed-use development within a Strategic Centre context that aligns with, supports, and promotes key strategic planning priorities of State and local government.

In this regard, the objectives and intended outcomes of the Planning Proposal are outlined in the following:

- Facilitate a retail core by revitalising the existing supermarket in support of speciality retail and commercial spaces to attract residents, workers and visitors to the site, thereby improving retail and services opportunities offered within the Strategic Centre.
- Targeted approach for the site to align with the strategic vision of Epping by providing employment opportunities and street activation through small-scale retail spaces to facilitate day to night economy a, thereby providing lively, socially connected communities within the Epping.
- Assist the Epping Strategic Centre in achieving 4,300 additional jobs and 8,910 of dwelling growth by 2036, thereby meeting the projected growth outlined in the District Plan and LSPS.
- Provide housing growth and employment opportunities within the Epping Strategic Centre, which will be supported by mass transit networks such as Epping train station and the metro.
- Provide active and passive recreation opportunities for future residents, visitors and workers in the locality to encourage social interaction and inclusion within the community.
- Provide a mixed-use development that will improve employment opportunities, housing choice and public amenity and services to facilitate a 30-minute city.
- Provide a diversity of housing typologies and mixes to provide a variety of housing options within an area that is highly serviced by public transport, infrastructure and services.

6 Part 2 – Explanation of provisions

The planning proposal seeks to achieve the intended outcomes outlined in **Part 3** of this report through the following amendments to PLEP 2023:

- **Height of buildings** – Amend height from 48m to varied RLs to reflect future towers (RL 130, 206 and 197) – this equates to heights of 123m and 112m and includes allowance for plant/lift overrun.

- **Floor space ratio** – Introduce requirement for non-residential FSR of 1.5:1, resulting in a total floor space of 6:1 across the site via an additional local provision (below).

- **Additional local provision** – Include site in Special Provisions Area map with an accompanying local provision that allows for FSR to exceed those outlined in clause 4.3. The following wording is suggested:

  1) *This clause applies to land identified as "Area X" on the Special Provisions Area Map.*

  2) *A building on the land may exceed the maximum permissible FSR by up to 1.5:1 if the consent authority is satisfied the additional gross floor area will be used only for non-residential uses*

  3) *Development consent must not be granted to the erection of a building on the land unless the consent authority is satisfied—*

     (a) *part of the building will be used for non-residential use, and*

     (b) *that part of the building will have a gross floor area at least equal to a floor space ratio of 1.5:1.*

The inclusion of this development standards is to provide certainty that an appropriate amount of non-residential floor space will be achieved on the site and ensure objectives with the E1 zone will continue to be achieved. This is consistent with Council's vision for Epping, which is reinforced by years of strategic investigations including the Epping Planning Review and the subsequent planning proposal.

The provision of 1.5:1 is an appropriate outcome for the site. This has been acknowledged in post lodgement discussions with Council, having regard to its ability to accommodate a significant amount of non-residential floor space unlike many constraint sites within Epping that have fragmented ownership, are heritage impacted, locked up in strata or have recent DA approvals or are under construction.

No changes to the underlying zoning or uses are proposed. The relevant mapping changes are shown below and at **Part 4** of this report.

Overall, the proposed provisions are entirely consistent with the outcomes envisaged via the Council-led planning proposal. The proposal represents a refined and targeted approach for strategic sites as contemplated by the Department for the positive renewal of Epping.

6.1 DCP framework

A site-specific DCP has been workshopped with Council and establishes the built form and public domain parameters for future DAs on the site. The DCP provides clarity on a number of nuanced built form controls that respond to the unique setting of the site and to set a high quality vision including:

- **Site layout** – establishing a site plan that dictates the future location of built form, streets and public domain,
- **Open space and public domain** – setting out the quality and character of the internal plaza and publicly accessible open space area in the north western corner of the site,
- **Service lane off Carlingford Road for service vehicles** – this will minimise site ingress/egress off Rawson Street and be supported by appropriate design treatments and flood control measures,
- **Setbacks** – these are more consistent with the current DCP controls for Epping Town Centre than what was originally submitted, with bespoke controls now respond to its prominent corner location at Carlingford Road and Rawson Street and site constraints,
- **Building height** – establishing a height in storeys control for built form to correspond with the proposed LEP height control including desire for a 4-5 storey podium but to allow opportunity to explore a 3-4 storey podium subject,
- **Floor to floor heights** – to meet NCC requirements, structure and servicing input, falls within the slab to accommodate populace domain elements and transfer structures,
- **Tower length** – allowing a tower length of 45m to support residential GFA within the tower forms and within the maximum height control, and
- **Footprint size** – capping tower footprints to 990m^2 (inclusive of GFA, balconies and terraces) to correspond to the tower length control and allow residential GFA to be distributed into two tower forms.

7 Part 3 – Justification of strategic and site-specific merit

7.1 Section A – Need for the planning proposal

Is the planning proposal a result of an endorsed local strategic planning statement, strategic study or report?

The planning proposal is the direct result of an endorsed LSPS, strategic studies and reports. These namely include:

- Council's LSPS, which specifically outlines the requirement for new homes and jobs to be concentrated in Strategic Centres, including Epping,
- Council's LHS, which specifically provides priorities to deliver housing in already rezoned precincts including Epping and site-specific planning proposals whilst also providing a review of planning controls in Epping (Epping Planning Review),
- Supporting technical studies provided with Council's planning proposal to introduce a non-residential floor space control in Epping, including the *Commercial Floor space and Urban Design Report*,
- Related policy directives set out in the Region Plan and District Plan, and
- Proponent-led planning and design investigations.

The studies provide a clear strategy to see Epping transform into vibrant centre supported by high quality built form and jobs, reinforcing Epping's position as a Strategic Centre. In this regard, the planning proposal reflects a consistent line of sight to see positive renewal in Epping that delivers appropriate levels of commercial floor space.

PARRAMATTA LOCAL STRATEGIC PLANNING STATEMENT

Key to the LSPS is the recognition of housing and employment growth within the Epping to facilitate the status of Epping as a Strategic Centre in accordance with the District Plan. The key actions outlined in the LSPS that directly corresponds with the preparation of a Planning Proposal for the site include:

- **Planning Priority P3** - Support the growth of Parramatta's night time economy with a focus on Parramatta CBD and Strategic Centres at Sydney Olympic Park and Epping as well as Westmead,
- **Planning Priority P4** – Focus housing and employment in the GPOP and Strategic Centres, and
- **Planning Priority P11** – Building the capacity of the Parramatta CBD, Strategic Centres, Local Centres and Employment Lands to be strong, competitive and productive.

The planning proposal has been prepared to realise the priorities for Epping in accordance with the LSPS, as demonstrated by the following:

- It directly responds to the vision of the Parramatta LSPS by providing a mix of land uses, heights and residential and commercial floor space that will facilitate a combination of uses across the site, reinforcing Epping as a Strategic Centre,
- It achieves the intended future vision for Council by providing increased commercial floor space in Epping, as demonstrated by the proposed 1.5:1 non-residential floor space and delivery of a full-line supermarket,

- It achieves a wide mix of land uses (commercial, retail and residential and is supported by mass transit networks, thereby promoting walkability and sustainable travel opportunities,
- It achieves a highly permeable and activated ground plane, supporting activate frontages and economic activity in Epping,
- It will contribute to Epping's job target if 9,400 by 2036 and support 855 FTE jobs during construction and 311 FTE jobs during operation, and
- It will contribute to Epping's housing target of 17,600 by 2036.

PARRAMATTA LOCAL HOUSING STRATEGY

The LHS establishes a 20-year strategic direction for the City of Parramatta, providing evidence to support the preparations of the LSPS and the housing targets identified in the District Plan.

The LHS states that additional housing should be focused in identified growth precincts, which includes Epping Strategic Centre. The planning proposal is considered to achieve the outcomes of the LHS, as demonstrated by the following:

Epping is identified as a growth precinct that offers the highest opportunity in achieving a 30-minute door-to-door journey to work, noting the transit opportunities present. The LHS states:

Growth precincts should be the key focus to deliver increased housing contributing to the achievement of the 30-minute city, best utilise planned transport upgrades and focus City resources for the substantial task of efficient infrastructure delivery to support new communities.

Therefore, the planning proposal contributes to the 30-minute city by providing high-quality housing and employment within a transport rich environment.

The remaining dwelling capacity within the Epping Strategic Centre post 2021 is 4,490 dwellings, with 4,420 dwellings provided from 2016 to 2021. It is important to note based on our extensive analysis of opportunity sites in Epping, there are very few left of meaningful size to deliver a holistic and true mixed-use development including a full-line supermarket.

In this respect, the proposals serves as one of the key sites that has genuine capacity to contribute to Epping's housing targets in tandem with a strong presence of commercial floor space.

EPPING COMMERCIAL FLOOR SPACE AND URBAN DESIGN REPORT

The *Epping Commercial Floor Space Urban Design Report* was prepared by Council to document and address the erosion of commercial floor space within Epping.

The study was driven by the findings of a commercial floor space study in 2017 (see **Section 3.5.2**), which concluded that between 40,000-45,000m^2 of commercial floor space and 13,000m^2 of retail floor space was required for Epping by 2036.

As such, the urban design study sought to rectify this by mandating a minimum provision of 1:1 non-residential floor space within the centre. This would allow the envisaged floor space to be met. In addition, the study recommended an increase in heights that should accompany the proposed floor space. The site was identified as having a maximum height of 80m.

Therefore, the planning proposal is considered to achieve the intended outcomes of the urban design study and commercial floor space, by providing a 1.5:1 non-residential floor space in the form of a 4-5 storey podium with increase building heights.

Is the planning proposal the best means of achieving the objectives or intended outcomes, or is there a better way?

This planning proposal is considered to be the most appropriate method of achieving the intended urban renewal outcomes for the site and the benefits it could deliver to the broader community.

The previous Council planning proposal was submitted to facilitate commercial floor space and increase heights in Epping. While supported by Council, it did not receive Gateway Determination by the Department on the basis there was insufficient information to support a widespread planning framework for the centre. It acknowledged that the planning proposal had strategic alignment, however, few sites subject of the planning proposal would benefit from the outcomes as a result of a recent development in addition to heritage and overshadowing constraints.

The Department advised that a precinct-wide planning proposal was not considered the best means of achieving the intended outcomes of Epping. It recommended a more refined and targeted approach on select sites to be more appropriate.

Therefore, a site-specific planning proposal for 53-61 Rawson Street is considered to be the most effective way of achieving the means and outcomes of delivering commercial floor space in Epping for the following reasons:

- Many sites in Council's planning proposal would not benefit i.e. resulted in unacceptable overshadowing, heritage impacts to items and conservation zones, unable to be supported by infrastructure and inadequate consideration of traffic. This leaves limited opportunities to provide substantial non-residential floor space while incentivising renewal within the western part of Epping.

- Investigations undertaken by the project team demonstrates that of all the opportunity sites within the western town centre, the subject site is the only site with capacity to accommodate the large scale retail format (i.e. lot size, frontage with, access arrangement, proximity to heritage fabric, recent DA approvals etc).

- The basis of the proposal is commercial floor space – a non-residential FSR of 1.5:1 supports the renewal of 4.5:1 residential. It ensures future renewal does not erode residential capacity in Epping but delivers true mixed use outcome with a full-line supermarket and associated specialty retail offerings as a catalyst for the main street precinct.

- Following discussions with Council post-lodgement, it was agreed the site could accommodate an additional 0.5:1 of non-residential FSR above the originally proposed 1:1 non-residential FSR. The additional 0.5:1 non-residential floor space is depicted on the refined massing to accommodate 4,544m^2 of commercial areas. The overall provision of 1.5:1 of non-residential FSR will enhance employment opportunities within Epping consistent with Council's draft Economic Development Strategy, which identifies Epping as 'A major employment and business hub…'.

- The originally submitted proposal provided a non-residential FSR of 1:1, which replaced the existing non-residential uses on the site. The additional 0.5:1 provides for net increase in non-residential uses capable of being delivered.

- The additional 1.5:1 at basement/ground/podium floorplates and the significant site constraints necessitate an increase in height to support residential tower floorplates and to facilitate high quality amenity outcomes for the commercial/retail levels. The permeable retail levels

complement and achieve a superior outcome to a more conventional 'box-like' shopping centre model.

- It allows for the proposed heights to be achieved commensurate with the proposed FSR, addressing the historical mismatch between height and FSR controls in the centre. It will fully support the delivery of new housing and employment in a true mixed use manner.

- It represents a more refined, site-specific approach, which has enabled best design and amenity practice to be applied. As such, appropriate technical analysis have been incorporated to ensure the site is able to achieve a 1.5:1 non-residential floor space, thereby aligning with the strategic planning framework.

- It is the most effective way of providing assurance to Council, the Department and the community that genuine commercial floor space can be delivered, whilst also supporting renewal that positively contributes to the community and public domain.

7.2 Section B – Relationship to strategic planning framework

Will the planning proposal give effect to the objectives and actions of the applicable regional, or district plan or strategy (including any exhibited draft plans or strategies)?

This section demonstrates the planning proposals consistency against the Region Plan, District Plan and Council's LSPS. In short, the proposal is considered to be consistent with and give effect to the key priorities and actions contained within:

- Greater Sydney Region Plan, and
- Central City District Plan.

7.2.1 Greater Sydney Region Plan

The planning proposal is consistent with relevant key objectives in the Region Plan as demonstrated in **Table 6.**

TABLE 6 – GREATER SYDNEY REGION PLAN

OBJECTIVE		CONSISTENCY
1	Infrastructure supports the three cities	**Consistent.** The proposal is located within the heart of Epping Strategic Centre and within 200m walking distance of bus interchanges, Epping train station and the metro station. The site is well supported by social infrastructure. The site is located within 800m walking distance of Epping Community Centre, Epping Leisure and Learning Centre and Epping Library. Several schools are located within 2km of the site including Epping Public School, Epping Heights Public School and Sydney Science College.
3	Infrastructure adapts to meet future needs	**Consistent**. The proposal is supported with transport infrastructure that meet the needs of the future population. Key bus interchange services, Epping train station and the metro are within walking distance of the site. Services infrastructure does not need any major upgrades to accommodate the proposal.
4	Infrastructure use is optimised	**Consistent.** The proposal will optimise existing infrastructure by situating new homes and employment opportunities in close proximity to bus, train and metro services, open space, retail amenity and other local services.
5	Benefits of growth realised by collaboration of governments, community and business	**Consistent.** The proposal has been subject to ongoing discussion and collaboration with Council to ensure an outcome that is consistent with the directions of local planning policy.
6	Services and infrastructure meet communities' changing needs	**Consistent**. The proposal will provide a number of significant benefits for existing and future residents to reflect the changing role and expectation of Strategic Centres. These include: • New high-density housing opportunities in close proximity to a suburban and metro train line, • Public open space including a pocket park, publicly accessible plaza and communal open space,

OBJECTIVE		CONSISTENCY
		• A revitalised supermarket supported with retail and commercial spaces, and • Pedestrian improvements in and around the site.
7	Communities are healthy, resilient and socially connected	**Consistent.** The proposal will include 50% of the site as publicly accessible open space in the form of a pocket park, communal areas, and a public domain, which will encourage socially connected communities. In addition, the proposal will provide new through site links to improve pedestrian experience and permeability within the site and other sites within the Epping, thereby improving street activation. The public domain has the potential to become a meeting place for future residents, works and visitors, thereby encouraging community interaction.
8	Greater Sydney's communities are culturally rich with diverse neighbourhoods	**Consistent.** The proposal seeks to provide a range of housing mixes from 1-bedroom to 3-bedroom apartment products to support the ongoing renewal of Epping. Specifically, this renewal will be supported by a generous public domain, new open space and a significant retail offering.
9	Greater Sydney celebrates the arts and supports creative industries and innovation	**Consistent.** The proposal will provide an opportunity for public art throughout the precinct. The submitted landscape concept design shows potential for future development to incorporate a strong sense of place and themes of Connecting with Country.
10	Greater housing supply	**Consistent.** The proposal will support the delivering of approximately 406 apartments within a designated Strategic Centre.
11	Housing is more diverse and affordable	**Consistent.** The proposal will support the delivering of approximately 406 apartments in a range of 1, 2 and 3-bedroom layouts.
12	Great places that bring people together	**Consistent.** The size of the site affords opportunity to create a suitably scaled mixed-use development, and a sense of community via an improved public realm including a revitalised supermarket, retail and commercial spaces, new park and public domain.
14	A Metropolis of Three Cities – integrated land use and transport creates walkable and 30-minute cities	**Consistent.** The site forms a significant part of the nucleus of the Epping Strategic Centre. It is within 200m walking distance to retail spaces, key bus interchange services and the Epping train station and metro. In conjunction with on-site retail and commercial uses, community infrastructure and open space, the proposed development will strengthen 30-minute city outcomes.
15	The Eastern, GPOP and Western Economic Corridors are better connected and more competitive	**Not applicable.**
16	Freight and logistics network is competitive and efficient	**Consistent**. The proposal will not impact nor reduce freight and logistics networks.

	OBJECTIVE	CONSISTENCY
17	Regional connectivity is enhanced	**Consistent.** The proposal will support increased connectivity of people across Greater Sydney by situating renewal within walking distance of major transport infrastructure.
18	Harbour CBF is stronger and more competitive	**Not applicable.**
19	Greater Parramatta is stronger and better connected	**Consistent.** The site is located in a rich transport area, making it already accessible, and within a 30-minute train and bus commute to other surrounding major employment centres.
20	Western Sydney Airport and Badgerys Creek Aerotropolis are economic catalysts for Western Parkland City	**Not applicable.**
21	Internationally competitive health, education, research and innovation precincts	**Consistent.** The proposed density of development is strategically located near education precincts, i.e. Macquarie University.
22	Investment and business activity in centres	**Consistent.** The proposal will facilitate renewal of the site with true commercial floor space being delivered with a full-line supermarket and speciality retail offerings to stimulate business activity in Epping. Importantly, the improved retail offering on the site will encourage critical mass within Epping to undertake their daily shopping needs as opposed to driving to other supermarkets and shopping centres at Carlingford Court, Top Ryde and Macquarie Park.
23	Industrial and urban services land is planned, retained and managed	**Not applicable.**
24	Economic sectors are targeted for success	**Consistent.** The existing supermarket is currently not supported by specialty retail offerings, which ultimately make shopping in Epping less appealing in comparison to other centres. Renewal of the site will improve the economic performance of the supermarket and revitalise a key site in Epping.
25	The coast and waterways are protected and healthier	**Not applicable.**
26	A cool and green parkland city in the South Creek corridor	**Not applicable.**
27	Biodiversity is protected, urban bushland and remnant vegetation is enhanced	**Not applicable.**
28	Scenic and cultural landscapes are protected	**Consistent.** The proposal is designed with a strong focus on Connection to Country, as demonstrated in the accompanying Urban Design report.

OBJECTIVE		CONSISTENCY
29	Environmental, social and economic values in rural areas are protected and enhanced	**Not applicable.**
30	Urban tree canopy cover is increased	**Consistent.** The proposal provides deep soil (13.5%), allowing for growth of large and mature trees across the site. This is significant for an urban renewal site in the heart of a Strategic Centre.
31	Public open space is accessible, protected and enhanced	**Consistent.** The proposal will provide approximately 50% of the site as publicly accessible open space and includes new open space for passive recreation. This is considered to be well above and beyond typical renewal infill proposals. The site's renewal will significantly enhance open space accessibility in the centre.
32	The Green Grid links parks, open spaces, bushland and walking and cycling paths	**Consistent.** The proposal is entirely consistent with the Green Grid and provides new open space in the northwestern portion of the site that responds to existing open space in Boronia Park.
33	A low-carbon city contributes to net-zero emissions by 2050 and mitigates climate change	**Consistent.** The proposal is designed to have a strong focus on reducing carbon emissions. Refer to the accompanying ESD report, which specifies the strategic elements of the built form that will aid in facilitating a low-carbon city.
34	Energy and water flows are captured, used and re-used	**Consistent.** As referred to in the accompanying ESD report, rainwater harvesting and re-use, site electrification and facilities, energy efficient lighting systems and lighting controls will be utilised.
35	More waste is re-used and recycled to support the development of a circular economy	**Consistent.** The proposal will promote waste re-use and recycling processes where possible.
36	People and places adapt to climate change and future shocks and stresses	**Consistent.** The proposal includes processes that will aid in adapting to climate change and future shocks and stresses, as demonstrated in the accompanying ESD report.
37	Exposure to natural and urban hazards is reduced	**Consistent.** The proposal has been designed so as to mitigate flood impacts by not proposing any works on the flood affected portion of the site.
38	Heatwaves and extreme heat are managed	**Consistent.** The proposal provides 13.5% of deep soil area to mitigate urban heat island effect and reduce vulnerability to extreme heat.

7.2.2 Central City District Plan

The planning proposal is consistent with relevant key objectives in the District Plan as demonstrated in **Table 7.**

TABLE 7 – CENTRAL CITY DISTRICT PLAN

PLANNING PRIORITY		CONSISTENCY
C1	Planning for a city supported by infrastructure	**Consistent.** The site is considered to be in a prime location, being in close proximity to major transit links, retail spaces, and major road networks. It is also within walkable distance of an established recreational facility, i.e., Boronia Park. The proposal also seeks to provide new recreational and community infrastructure on-site in the form of communal areas, retail and commercial spaces, a revitalised supermarket and other active/passive recreation spaces.
C3	Providing services and social infrastructure to meet peoples changing needs	**Consistent.** The proposal provides adequate open space as well as community infrastructure to meet the needs of the future population. The site is well supported by social infrastructure. The site is located within 800m walking distance of Epping Community Centre, Epping Leisure and Learning Centre and Epping Library. Several schools are located within 2km of the site including Epping Public School, Epping Heights Public School and Sydney Science College.
C4	Fostering healthy, creative, culturally rich and socially connected communities	**Consistent.** The proposal is for a mixed-use development, which seeks to activate the Rawson Street and Beecroft Road streetscape by providing retail and recreational spaces that will be a focal space for the community to meet, socialise and connect. It will facilitate a progressive development that can provide a dynamic mix of residential living, public spaces and commercial floor space.
C5	Providing housing supply, choice and affordability, with access to jobs and services	**Consistent.** The proposal will deliver diverse housing typologies in an accessible location catering for different stages of life including for young couples, families and also downsizers and retirees. The housing typology proposed will feature a range of one, two and three-bedroom units. The site is well positioned to provide high quality housing in a suitable location, near high transit networks and major roads to support access to amenity, jobs and services.
C9	Delivering integrated land use and transport planning and a 30-minute city	**Consistent.** The site integrates retail, commercial and high-density residential land uses in proximity to key bus interchange services, Epping train station and the metro along Beecroft Road, providing connection with Parramatta CBD. The sites location within a rich transport environment achieves the outcome to deliver a 30-minute city.
C16	Increasing urban tree canopy cover and delivering Green Grid connections	**Consistent.** The proposal seeks to provide a total of 13.5% of deep soil area. In addition, 50% of the site will be publicly accessible open domain.
C17	Delivering high quality open space	**Consistent.**

PLANNING PRIORITY		CONSISTENCY
		The proposal will deliver 50% of publicly accessible open space in the form of a new park, communal open areas and a public domain. The inclusion of a significant open space offering in the northwestern portion of the site for a range of passive uses is well above the typical expectations for urban infill proposals within the nucleus of a Strategic Centre.
C19	Reducing carbon emissions and managing energy, water and waste efficiently	**Consistent.** The proposal is capable of implementing a range of sustainable practices, including: • Achieve a 5.5 Star NABERS Rating for commercial office space, • Achieve a 3 Star NABERS Water Rating for commercial office space, • Achieve a 7 Star average NatHERS rating for residential dwellings, • Implementing a full electrified precinct, • Responsibly sized waste separation and storage areas, and • Rainwater harvesting and reuse. Refer to the accompanying ESD report at **Appendix 8**.
C29	Adapting to the impacts of urban and natural hazards and climate change	**Consistent.** The proposal will adapt to impacts of urban and natural hazards and climate change through the use of energy efficient lighting systems, application of Water Sensitive Urban Design (**WSUD**) principles, rainwater harvesting and reuse and site electrification and facilities that will enable on-site renewable energy production. Refer to the accompanying ESD report at **Appendix 8**.

Is the planning proposal consistent with a council LSPS that has been endorsed by the Planning Secretary or GSC, or another endorsed local strategy or strategic plan?

The planning proposal is entirely consistent with Council's LSPS. Under Parramatta's LSPS, Epping is reaffirmed as a Strategic Centre in which a wide mix of land uses (commercial and residential) is envisaged with high levels of amenity and walkability. Importantly, it is only one of two strategic centres in the LGA, with Sydney Olympic Park being the other.

Figure 27 provides an extract of the existing centre hierarchy in Parramatta LGA.

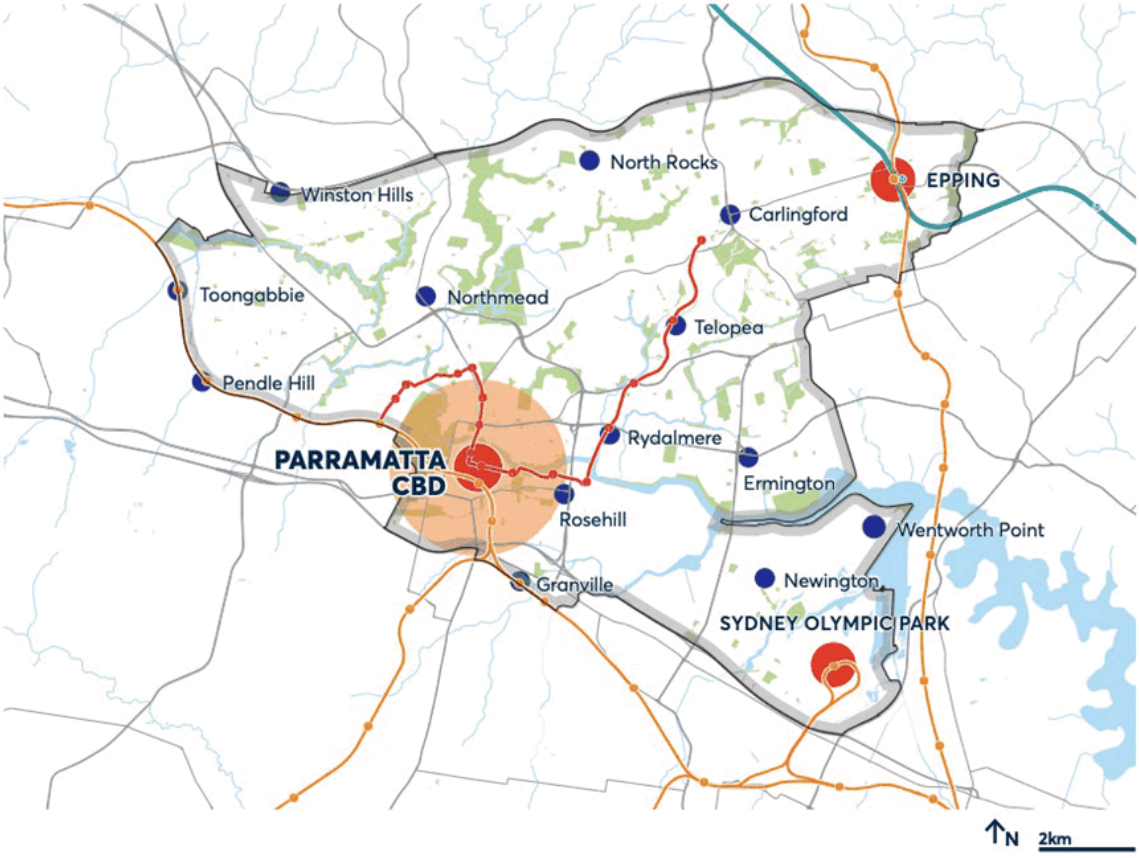


FIGURE 27 – PARRAMATTA LSPS CENTRE HEIRARCHY
Source: Parramatta LSPS

The LSPS defines Strategic Centres as:

In accordance with the District Plan, Epping and Sydney Olympic Park are Council's designated Strategic Centres. The District Plan says that the expectations for strategic centres are, in terms of land use, as follows:

- *co-location of a wide mix of land uses, including residential;*
- *high levels of amenity and walkability and being cycle friendly; and*
- *areas identified for commercial uses, and where appropriate, commercial cores.*

The LSPS specifies that a future City of Parramatta will need to have increased commercial floor space in Epping, in conjunction with a concentration of high-rise development, thereby achieving the specified housing and job targets.

In this regard, the proposal will be entirely consistent with the LSPS. Key reasons include:

- Delivering non-residential floor space, thereby generating employment opportunities and providing a new focal point on the western side of Epping. The proposed revitalisation of the Coles Supermarket will be supported with speciality retail and commercial spaces,

attracting local residents to the centre and creating a true destination and community focal point.

- Provides a level of density that complements existing development on the eastern side of Epping.
- Locating housing in a highly accessible location, within a Strategic Centre context and in close proximity to key transit nodes, i.e. Epping train station, the metro and bus interchanges, supported by infrastructure and open space.
- Delivering a diversity of housing typologies and mixes, ranging from studio apartments to larger 3-storey apartments.
- A new public domain, park and communal open space areas to facilitate social inclusion, interaction and meeting for the Epping community.

As such, the proposal is entirely consistent with the LSPS and will fulfill the role of Strategic Centres as identified in the District Plan and LSPS.

Table 8 reaffirms the planning proposals consistency with the LSPS directions.

TABLE 8 – LOCAL STRATEGIC PLANNING STATEMENT

POLICY DIRECTIONS		CONSISTENCY
P1	Support job growth in key employment centres to reinforce Greater Parramatta's role as the Central City.	**Consistent.** In accordance with the Economic Impact Assessment report prepared by Atlas Economics (**Appendix 6**), the findings suggest that the 'Proposal is expected to generate an annual GRP of $88.6 million to the local economy and support almost 311 Full Time Employment (**FTE**) jobs on-site'.
P3	Support the growth of Parramatta's night time economy with a focus on Parramatta CBD and Strategic Centres at Sydney Olympic Park and Epping as well as Westmead	**Consistent.** The proposal supports the growth of night time economy by providing a mixed-use development within a Strategic Centre context. The proposed retail and commercial opportunities available for the site are capable of delivering outcomes for night time activity.
P7	Encourage the design of development in Growth Precincts, Strategic Centres and Local Centres that maximises accessibility to, and safety of, existing and planned public transport services, including heavy rail, light rail, bus and ferry which includes technological innovation and improved liveability, sustainability and place management outcomes.	**Consistent.** The proposal supports the transformation of Epping as a Strategic Centre by introducing new open spaces that will better facilitate access to the public transport network. The site is conveniently located within a 200m walk of key bus interchange services Epping train station and the metro.
P11	Explore opportunities for transport infrastructure to facilitate higher order employment within Strategic Employment Lands in the GPOP area.	**Consistent.** The proposed site is located in a rich transport environment, noting the close proximity to Epping metro, Epping train station and a variety of key bus interchanges. As such, the proposed development seeks to provide employment opportunities, which will be supported by high transit networks.

POLICY DIRECTIONS		CONSISTENCY
P12	Focus high-rise development in Parramatta CBD and Strategic Centres (Epping and Sydney Olympic Park) as shown on the Structure Plan Map	**Consistent.** The proposal is entirely consistent with this direction by providing higher density development in Epping. The built form is consistent with the scale of surrounding development in Epping and will complement the scale of towers on the eastern side of the rail line.
P24	Provide for a range of housing types and sizes that cater to the Parramatta community to ensure housing diversity consistent with the City of Parramatta Local Housing Strategy (once endorsed by Council and DPIE).	**Consistent.** The proposal is capable of delivering a range of 1, 2 and 3-bedroom apartments. The preferred masterplan shows a potential mix of: • 1 bed = 24%, • 2 bed = 62%, and • 3 bed = 14%,
P30	Provide for appropriate scale public artwork and cultural facilities in Local and Strategic Centres, as well as Parramatta City Centre Art and Culture Walk, to promote cultural expression and a distinctive sense of the place.	**Consistent.** The proposal is capable of supporting public art. The publicly accessible open space and civic spaces have potential to accommodate a range of interpretative structures, public domain elements and treatments to reinforce the site as a destination of the western side of Epping. These will be further progressed at DA stage. The proposal is further capable of supporting public art and has an opportunity to build on the strength of the Connection to Country narrative developed by the design team.
P31	Support the design and planning of Growth Precincts and Housing Diversity Precincts that commemorates the history of the site or locality to provide a link between past and future generations.	**Consistent.** The proposal will commemorate history of the local area. The design narrative was formulated to integrate the reinstated overland flow path as a main feature in the landscape design of the new park at the north western corner of the site. The narrative builds upon the understanding that the creek and waters of the upper Lane Cove River are important to the traditional custodians of the land and waters.
P33	Create a high quality and safe walking and cycling network across the LGA to cater for and encourage short trips (up to 2km) to local centres, jobs, public and shared transport services, schools, local open space, Green Grid and other trip generators.	**Consistent.** The proposal will support Sydney's Green Grid by incorporating a generously sized open space area adjacent to Boronia Park. Furthermore, the provision of a full-line supermarket with speciality retail will promote local pedestrian trips in Epping and minimise vehicle travel to surrounding retail centres including Macquarie Park, Carlingford Court and Top Ryde.
P35	Advocate for bringing-forward the Sydney Metro West delivery, as well as other city-shaping transport (Parramatta to Epping, Parramatta to Western Sydney Airport, Parramatta to Norwest, Parramatta to Kogarah via Bankstown and Parramatta Light Rail Stage 2) and with improved walking and cycling access and public spaces to those services.	**Consistent.** The proposed height and scale of the development is considered to be appropriately placed in a location that is highly serviced by frequent transit networks.

POLICY DIRECTIONS		CONSISTENCY
P39	Encourage a thriving small business sector where new and existing businesses can grow and expand.	**Consistent.** The proposal seeks to provide a dedicated 1.5:1 non-residential floor space ratio, by way of speciality retail stores to facilitate a retail core for the western side of Epping. The proposed retail shops will be supported with the expanded supermarket offering, specialty shops and commercial suites with the aim of attracting future residents, workers and visitors to the site as a key retail node.
P46	Advocate for the outcomes of the Epping Town Centre Review when finalised to understand future employment needs within the Epping Strategic Centre	**Consistent.** The proposed development aligns with the strategic vision for Epping by implementing a substantial quantum of commercial and retail land uses, which have been eroded by the increased residential development in the locality. Whilst providing a substantial amount of floor space it will allow for other proposals to contribute to employment and housing supply. It does not preclude the ability of other proposals to be pursued to support the vision of Epping.
P53	Protect and increase tree canopy cover and vegetation across public and private land.	**Consistent.** The proposal will provide 13.5% of deep soil area, which will improve the ecological value of the locality.
P54	Enhance street tree canopy to support walkability	**Consistent.** Increased street tree canopy can be provided, thereby being consistent with Councils vision.
P56	Provide for a diversity of green spaces to support different community needs such as for recreation, relaxation and enjoyment.	**Consistent.** The proposal provides a new park which has potential to improve linkages to Boronia Park via pathways. In addition, a new permeable public domain is proposed, which will promote social inclusion. Overall, a range of publicly accessible spaces are proposed across the site to support the community.
P59	Make Parramatta a low carbon city.	**Consistent.** The proposal is supported by an ESD report, which outlines strategies to ensure redevelopment of the site responds to a zero-carbon environment.
P62	Accelerate low carbon transport and emerging trends in mobility.	**Consistent.** The proposal seeks to create a highly permeable environment that encourages active and public modes of transport. Strategies include providing site-through links and charging stations, whilst the site's strategic location encourages the use of public transport.
P64	Reduce flood risk through planning controls that support flood detention, diversion and improved conveyance.	**Consistent.** The proposed development is strategically located away from the flood prone areas of the site to mitigate adverse impacts. In addition, the site is able to comply with relevant applicable planning controls.

Is the planning proposal consistent with any other applicable State and regional studies or strategies?

FUTURE TRANSPORT STRATEGY

The planning proposal is consistent with other applicable State strategies including Future Transport Strategy. The Strategy is an update to the 2056 Transport Strategy for NSW published in 2018.

It is a 40-year strategy supported by plans for regional NSW and Greater Sydney that seeks to align transport with land use. It acknowledges key interchanges at Epping will provide improved links between Sydney and regional NSW.

The proposal is consistent with a range of directions under the Future Transport Strategy including:

- C1.1. Enhance 30-minute metropolitan cities,
- C.1.2. Connect our regional cities, centres, towns and villages,
- C2.1. Support car-free, active, sustainable transport options,
- C3.1. Provide transport choices for people no matter where they live,
- P1.2. Support growth around public transport,
- P2.1. Support thriving and healthy 15-minute neighbourhoods,
- P2.2. Mange street space as public space, and
- P4.1. Ensure a net increase in urban trees and no net loss in biodiversity.

Is the planning proposal consistent with applicable State Environmental Planning Policies?

Yes, as outlined in **Table 9** the planning proposal is consistent with relevant State Environmental Planning Policies (**SEPP**).

TABLE 9 – STATE ENVIRONMENTAL PLANNING POLICIES

SEPP	CONSISTENT	COMMENTS
SEPP (Biodiversity and Conservation) 2021	Yes	The proposal does not contradict or hinder the application of the SEPP.
SEPP (BASIX) 2004	Yes	The proposal does not contradict or hinder the application of the SEPP.
SEPP (Exempt and Complying Development Codes) 2008	Yes	The proposal does not contradict or hinder the application of the SEPP.
SEPP (Housing) 2021	Yes	The proposal does not contradict or hinder the application of the SEPP. The architectural drawings (**Appendix 1**) demonstrate the proposal is capable of complying with the key design criteria and guidance of Housing SEPP and the ADG.
SEPP (Industry and Employment) 2021	Yes	The proposal does not contradict or hinder the application of the SEPP.
SEPP (Planning Systems) 2021	Yes	The proposal does not contradict or hinder the application of the SEPP.
SEPP (Precincts—Central River City) 2021	N/A	The proposal does not contradict or hinder the application of the SEPP.

SEPP	CONSISTENT	COMMENTS
		The proposal is not within a precinct covered by the SEPP.
SEPP (Primary Production) 2021	N/A	The proposal does not contradict or hinder the application of the SEPP. The proposal does not relate to primary production land.
SEPP (Resilience and Hazards) 2021	Yes	The proposal does not contradict or hinder the application of the SEPP. A contamination study has been prepared (**Appendix 11**), which demonstrates the site can be made suitable for its intended purpose subject to additional testing.
SEPP (Resources and Energy) 2021	N/A	The proposal does not contradict or hinder the application of the SEPP. The proposal does not involve mining or extractive industry.
SEPP (Transport and Infrastructure) 2021	Yes	The proposal does not contradict or hinder the application of the SEPP.

Is the planning proposal consistent with the applicable Ministerial Directions (Section 9.1 directions) or key government priority?

Yes, as outlined in **Table 10** the planning proposal is consistent with all applicable Section 9.1 directions. Where the planning proposal is inconsistent with a direction, justification is provided.

TABLE 10 – SECTION 9.1 MINISTERIAL DIRECTIONS

DIRECTION	CONSISTENT	COMMENTS
Focus area 1: Planning Systems		
1.1 Implementation of Regional Plans	N/A	N/A
1.2 Development of Aboriginal Land Council land	N/A	N/A
1.3 Approval and Referral Requirements	N/A	N/A
1.4 Site Specific Provisions	Yes	The proposal proposes the introduction of an Additional Local Provision that will permit an additional 1.5:1 FSR on the site provided the consent authority is satisfied it is used for non-residential purposes. The application of Additional Local Provisions is common practice in PLEP 2023 and is therefore considered suitable to facilitate development to be carried out.
1.4A Exclusion of Development Standards from Variation	N/A	N/A
Focus area 1: Planning Systems – Place-based		

DIRECTION	CONSISTENT	COMMENTS
1.5 Parramatta Road Corridor Urban Transformation Strategy	N/A	N/A
1.6 Implementation of North West Priority Growth Area Land Use and Infrastructure Implementation Plan	N/A	N/A
1.7 Implementation of Greater Parramatta Priority Growth Area Interim Land Use and Infrastructure Implementation Plan	N/A	N/A
1.8 Implementation of Wilton Priority Growth Area Interim Land Use and Infrastructure Implementation Plan	N/A	N/A
1.9 Implementation of Glenfield to Macarthur Urban Renewal Corridor	N/A	N/A
1.10 Implementation of the Western Sydney Aerotropolis Plan	N/A	N/A
1.11 Implementation of Bayside West Precincts 2036 Plan	N/A	N/A
1.12 Implementation of Planning Principles for the Cooks Cove Precinct	N/A	N/A
1.13 Implementation of St Leonards and Crows Nest 2036 Plan	N/A	N/A
1.14 Implementation of Greater Macarthur 2040	N/A	N/A
1.15 Implementation of the Pyrmont Peninsula Place Strategy	N/A	N/A
1.16 North West Rail Link Corridor Strategy	N/A	N/A
1.17 Implementation of the Bays West Place Strategy	N/A	N/A
1.18 Implementation of the Macquarie Park Innovation Precinct	N/A	N/A
1.19 Implementation of the Westmead Place Strategy	N/A	N/A
1.20 Implementation of the Camellia-Rosehill Place Strategy	N/A	N/A
1.21 Implementation of South West Growth Area Structure Plan	N/A	N/A
1.22 Implementation of the Cherrybrook Station Place Strategy	N/A	N/A
Focus area 2: Design and Place		
N/A		
Focus area 3: Biodiversity and Conservation		
3.1 Conservation Zones	N/A	N/A

DIRECTION	CONSISTENT	COMMENTS
3.2 Heritage Conservation	N/A	N/A
3.3 Sydney Drinking Water Catchments	N/A	N/A
3.4 Application of C2 and C3 Zones and Environmental Overlays in Far North Coast LEPs	N/A	N/A
3.5 Recreation Vehicle Areas	N/A	N/A
3.6 Strategic Conservation Planning	N/A	N/A
3.7 Public Bushland	N/A	N/A
3.8 Willandra Lakes Region	N/A	N/A
3.9 Sydney Harbour Foreshores and Waterways Area	N/A	N/A
3.10 Water Catchment Protection	N/A	N/A
Focus Area 4: Resilience and Hazards		
4.1 Flooding	Yes, and justified by Direction	The proposal will increase the development/dwelling density on land identified as being partially flood affected. A flood assessment has been prepared (**Appendix 5**), which demonstrates the proposed works will have no impact on existing flood behaviour. The flood assessment provides a detailed response to the directions, as discussed below.
4.2 Coastal Management	N/A	N/A
4.3 Planning for Bushfire Protection	N/A	N/A
4.4 Remediation of Contaminated Land	Yes	The proposal does not seek to amend the list of permissible uses in the zone. For the avoidance of doubt, a PSI has been prepared (**Appendix 11**) to support the planning proposal. It confirms the site can be made suitable for the proposed development.
4.5 Acid Sulfate Soils	Yes	As above
4.6 Mine Subsidence and Unstable Land	N/A	N/A
Focus Area 5: Transport and Infrastructure		
5.1 Integrated Land Use and Transport	Yes	The proposal will support access to housing, jobs, services by walking, cycling and public transport in Epping.

DIRECTION	CONSISTENT	COMMENTS
		The retention and expansion of the Coles Supermarket will reduce travel demand to surrounding centres for their daily shopping needs. The planning proposal is supported by a Traffic Impact Assessment (**Appendix 4**), which concludes the proposal will have an acceptable impact on the surrounding road network and intersection performance.
5.2 Reserving Land for Public Purposes	N/A	N/A
5.3 Development Near Regulated Airports and Defence Airfields	N/A	N/A
5.4 Shooting Ranges		
Focus Area 6: Housing		
6.1 Residential Zones	Yes	The proposal will support housing choice to cater for future housing needs and locate these to make efficient use of infrastructure and services. Importantly, the provision of a 1.5:1 non-residential requirement will not reduce the permissible residential density of land consistent with Direction 6.1(2)(b).
6.2 Caravan Parks and Manufactured Home Estates		
Focus Area 7: Industry and Employment		
7.1 Business and Industrial Zones	Yes	The proposal will retain the existing E1 Local Centre zone and facilitate additional employment opportunities on the site via a 1.5:1 non-residential FSR control. The proposal represents one of the largest consolidated landholdings on the western side of Epping capable of fulfilling Council's aspirations to see true employment uses in the centre.
7.2 Reduction in non-hosted short-term rental accommodation period	N/A	N/A
7.3 Commercial and Retail Development along the Pacific Highway, North Coast	N/A	N/A
Focus area 8: Resources and Energy		
8.1 Mining, Petroleum Production and Extractive Industries	N/A	N/A
Focus area 9: Primary Production		

DIRECTION	CONSISTENT	COMMENTS
9.1 Rural Zones	N/A	N/A
9.2 Rural Lands	N/A	N/A
9.3 Oyster Aquaculture	N/A	N/A
9.4 Farmland of State and Regional Significance on the NSW Far North Coast	N/A	N/A

DRECTION 4.1 FLOODING

The objectives of the Flooding Direction, as outlined in the Local Planning Direction are outlined as follows:

(a) *ensure that development of flood prone land is consistent with the NSW Government's Flood Prone Land Policy and the principles of the Floodplain Development Manual 2005, and*

(b) *ensure that the provisions of an LEP that apply to flood prone land are commensurate with flood behaviour and includes consideration of the potential flood impacts both on and off the subject land.*

A flood assessment has been prepared by GRC Hydro (**Appendix 5**). GRC Hydro state the preferred masterplan have been deliberately situated outside areas of significant flow in the 1% AEP event and as such, there will be no impacts on flood behaviour as a result of the planning proposal.

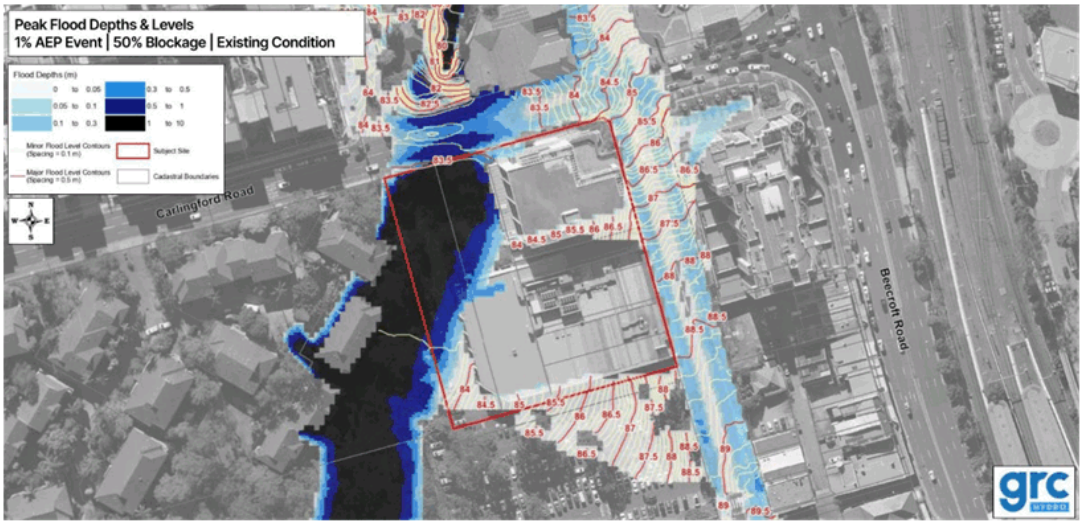


FIGURE 28 – PEAK FLOOD DEPTHS AND LEVELS – 1% AEP EXISTING CONDITION
Source: GRC Hydro

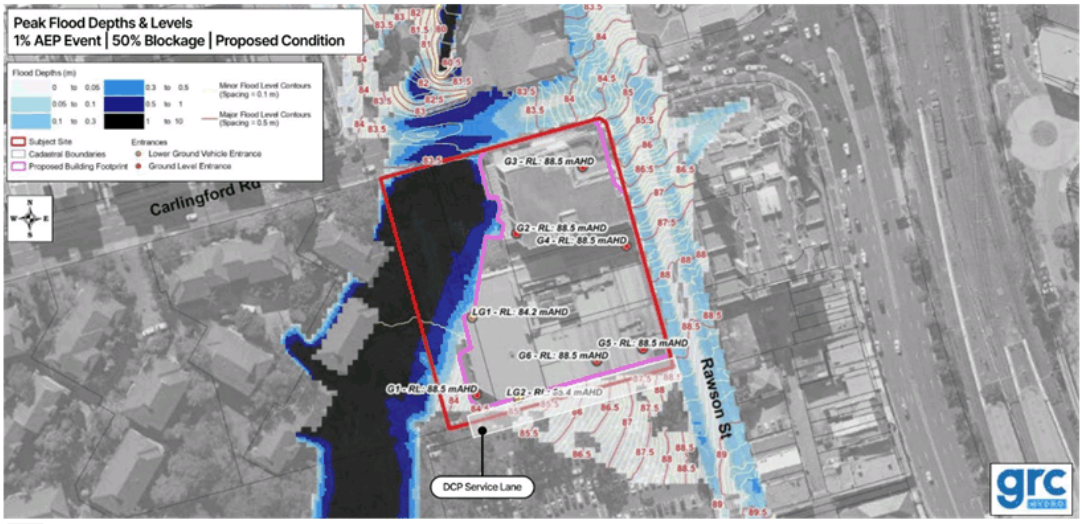


FIGURE 29 – PEAK FLOOD DEPTHS AND LEVELS – 1% AEP POST DEVELOPMENT CONDITION
Source: GRC Hydro

GRC Hydro have reviewed the preferred masterplan relative to several planning instruments including PLEP 2023, PDCP 2011 and the relevant ministerial directions. These include:

- The planning proposal demonstrates consistency with the controls and objectives of PLEP 2023 and DCP, as well as demonstrating the proposal is consistent with the *NSW Floodplain Development Manual 2005*.
- The planning proposal meet the relevant flood planning levels and off-site impact requirements. Egress via Rawson Street avoids all interaction with hazardous mainstream flooding.
- The key principles of the *Floodplain Development Manual 2005* are that no development should occur in floodway, floor levels should meet flood planning level requirements and flood risk should be managed. All key three principles are met by the planning proposal and compliance with PLEP 2023 and the DCP further demonstrate this.
- The planning proposal does not result in any impacts on adjacent development in the 1% AEP event.
- The planning proposal and preferred masterplan is not proposed in an area of high hazard. Furthermore, residential levels are significantly elevated above the 1% AEP mainstream flood level of 83.7m AHD at the site.
- Safe egress to Rawson Street is available in evacuation events.

A review of the planning proposal and preferred masterplan demonstrates the planning proposal is consistent with the objectives and requirements of Direction 4.1.

Furthermore, a letter has also been prepared by GRC Hydro dated 24 April 2024, which considers the flood impacts of the proposal against the amendments made following post lodgement and the refined masterplan. The letter confirms that there are no changes that would change the previously presented report or conclusions. GRC Hydro state:

…based on the information presented to GRC Hydro that the flood assessment (GRC Hydro 2023), including the risk assessment and outcomes, are still valid with the proposed changes provided by Oakstand on the 23rd April 2024. No changes have been proposed to the key items contributing to the conclusion of the proposed "Epping Town Centre" being of a low flood risk. As such, there is no need to update either the modelling or reporting presented in the 'Epping Town Centre, Flood Assessment for Planning Proposal', Revision C, GRC Hydro, 5th December 2023.

7.3 Section C – Environmental, social and economic impact

Is there any other likelihood that critical habitat or threatened species, populations or ecological communities, or their habitats, will be adversely affected because of the proposal?

The site is located within an established urban context. As such, the likelihood of critical habitat or threatened species, populations or ecological communities being impacted by the proposed development is considered unlikely.

Are there any other likely environmental effects as a result of the planning proposal and how are they proposed to be managed?

The proposal has assessed matters concerning flooding, traffic, urban design and built form in consideration and preparation of the planning proposal. As demonstrated below, any impacts can and will be appropriately managed.

Discussion and assessment of the environmental and urban context is discussed below.

URBAN DESIGN

Following lodgement of the planning proposal, the proponent and Council worked constructively to develop a refined masterplan and built form massing for the site.

The updated masterplan was developed in response to the desire for future redevelopment to deliver well-proportioned built forms to strengthen the street wall presence at Rawson Street and Carlingford Road and concentrate residential floor space within two tower forms.

This refined massing strategy ensures impacts to neighbouring properties and the public domain are minimised, while facilitating publicly accessible open spaces and retaining the function of the role of the site as a key mixed-use destination of the western side of Epping.

In response to the changes post lodgement, Gyde have prepared an Urban Design Addendum (**Appendix 2**), which builds on previous analysis of the lodged Urban Design Report that evidences the site has the capacity to become a key retail node in Epping. The Urban Design Addendum is supported by a suite of new principles that have guided refinements to the massing post lodgement.

Summary of original Urban Design Analysis

As part of the originally submitted Urban Design Report, the analysis confirmed:

1. The site has the capacity to accommodate large format retail including a supermarket, as a result of the site size and lot depth.

2. Am opportunity sites analysis confirmed the site remains the largest and only viable location to deliver true non-residential floor space, including a full-line supermarket and supporting retail. Most of the existing built form in Epping is either constrained by Strata lots, recently built developments, fragmented lot ownership, irregular site geometries and heritage.

The findings in the submitted Urban Design Report reinforce the proposition that the site is a unique opportunity to provide additional retail and commercial floor space. Genuine renewal of the site will allow for the creation of a vibrant and active retail hub that will provide an alternative choice for residents instead of traveling to Carlingford Court or Macquarie Centre for their daily needs. This is entirely consistent with Council's long-standing commitment to delivering non-residential floor space in Epping.

Amended massing and masterplan outcomes

The amendments to the planning proposal, and subsequent refinements to the massing post-lodgement builds on a comprehensive body of built form testing. This extensive testing and amendments to the proposal were framed by a range of considerations including orientation of tower forms to facilitate outlook and sky exposure to the park and amplify visual permeability, enhance visual connectivity, redistribute mass to reinforce the street wall at Rawson Street and Carlingford Road and strengthen the commercial floorspace offering by increasing non-residential FSR.

In consultation with Council staff, the amendments establish a balanced distribution of scale across the podium and tower forms, which affords significant improvements to the ground plane and the appearance of the site when viewed from the surrounding streetscape. These refinements result in towers of 33 and 36 storeys and a revised non-residential FSR of 1.5:1 (6:1 total).

In relation to the refined massing and its visual impacts, it presents with increased scale however, the towers are more legible as individual forms whereas towers in the previous massing, the towers presented in a cluster formation with tower heights transitioning to the north.

The amended podium form provides enhanced spatial containment to the street. Where the previous scheme provides a 'staggered' podium edge, the amended podium is increased in scale to express a 4-5 storey street wall to define the corner.

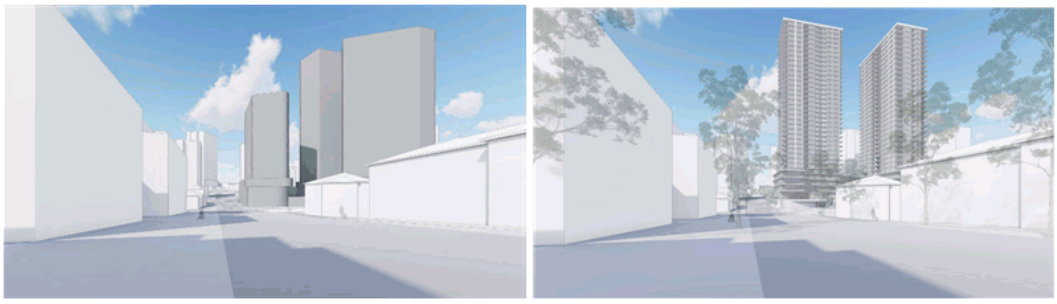


FIGURE 30 – PERSPECTIVE VIEW FROM CARLINGFORD ROAD – LOOKING EAST
Source: Kann Finch

In short, the masterplan delivers:

1. Improved the built form response to deliver high quality mixed-use development on a key site in Epping within immediate walking distance of public transport,

2. Maximised building separation t sensitive interfaces by concentrating scale at the corner of Rawson Street and Carlingford Road,

3. Strengthened the podium form and emphasising height at the northern end of the centre to complement Council's vision for a wider urban profile.

4. Increased tower setbacks and enhanced public domain outcomes along Rawson Street to complement the evolving character of the western side of Epping.

FIGURE 31 – PERSPECTIVE VIEW FROM BORONIA PARK – LOOKING NORTH
Source: Kann Finch

DESIGN EXCELLENCE AND AMENITY

In addition to the extensive massing analysis undertaken, the project team engaged with Council's DEAP on a potential configuration of built form with heights similar to what has been proposed under this planning proposal. Initial proposals were presented to the final DEAP workshop on 20 January 2022, which noted the following:

> *The general massing and building heights are considered acceptable*

The acknowledgment of building heights from the DEAP have carried over through post-lodgement engagement discussions with Council in framing the refined masterplan for the site.

This refined masterplan has undergone testing against SEPP 65 and the ADG to demonstrate a future proposal is capable of exhibiting a high quality architectural design and amenity for future occupiers.

Table 12 below assesses the preferred masterplan against the ADG (refer to **Appendix 2** for a detailed discussion on ADG consistency). The proposal will exceed many of the key numeric design criteria set by the ADG.

TABLE 11 – ADG SUMMARY

CRITERIA	TARGET	COMPLIANCE
Solar access	Minimum 70%	71%
No solar	Maximum 15%	7%
Natural cross ventilation	Minimum 60% up to 9 storeys	71%
Communal open space	Minimum 25%	35% (15.5% of podium space, 13.5% of communal space in the western portion of the site and 6% forming a communal room)
Deep soil	Minimum 7%	13.5%
Building separation	24m (habitable to habitable	24m achieved

FIGURE 32 – SOLAR INSOLATION TESTING
Source: Kann Finch

OVERSHADOWING

The preferred masterplan and massing have been optimised to minimise overshadowing impacts to residential uses and Boronia Park to the west. In particular:

- The geometry of tower forms and the allocation of height, including the offset alignment of towers, has optimised the opportunities for maintaining solar access to ground plane areas within the internal plaza.

- Shaded areas to the south of the site are predominantly located over, or just beyond, the proposed DCP service laneway with good levels of solar access to remaining areas.

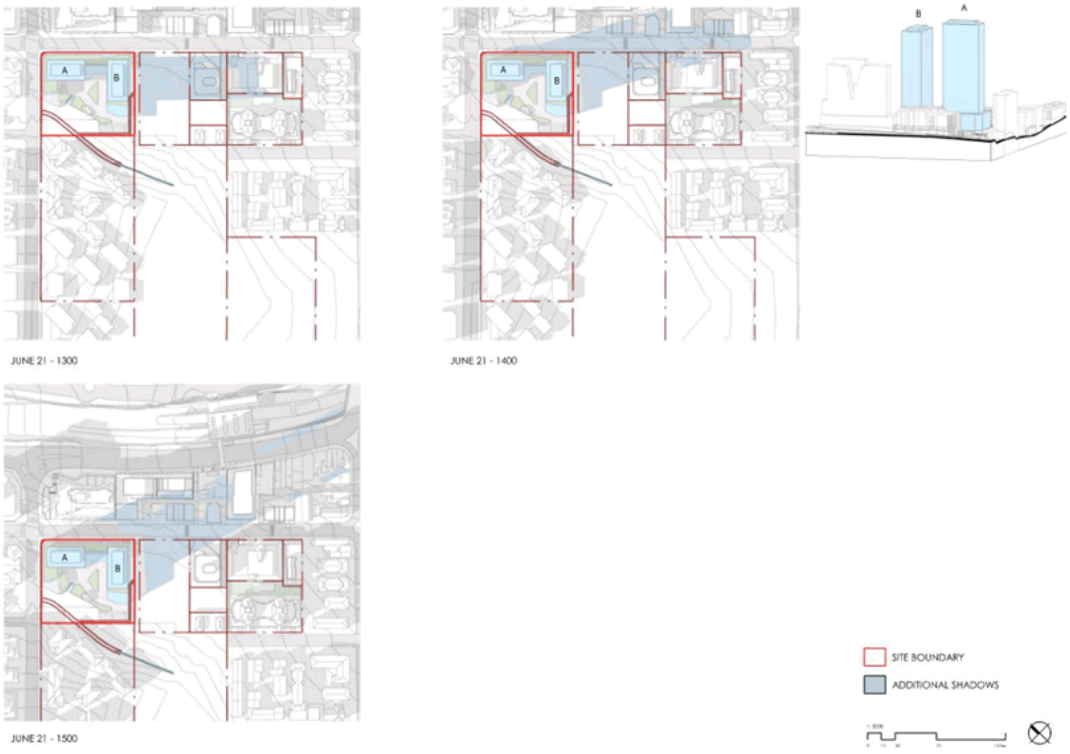
- The preferred massing delivers solar access to a majority of Council's car park for 3 or more hours between 9am and 3pm mid-winter.

Detailed shadow diagrams have been prepared between 9am and 3pm mid-winter to determine shadow impacts of the preferred masterplan. The shadow diagrams indicate that:

- Neighbouring residential development in Boronia Gardens will have suitable levels of sunlight maintained, with only shadow cast at only between 9am-10am.

- Boronia Park will not be impacted by additional overshadowing after midday during mid-winter. No additional overshadowing will occur during the busy after-school hours.

- Council's car park is located immediately south and therefore, experience impacts from any future development on the site. However, the sculpted tower forms will provide fast moving shadows and three or more hours of solar access to the majority of the car park will be provided.



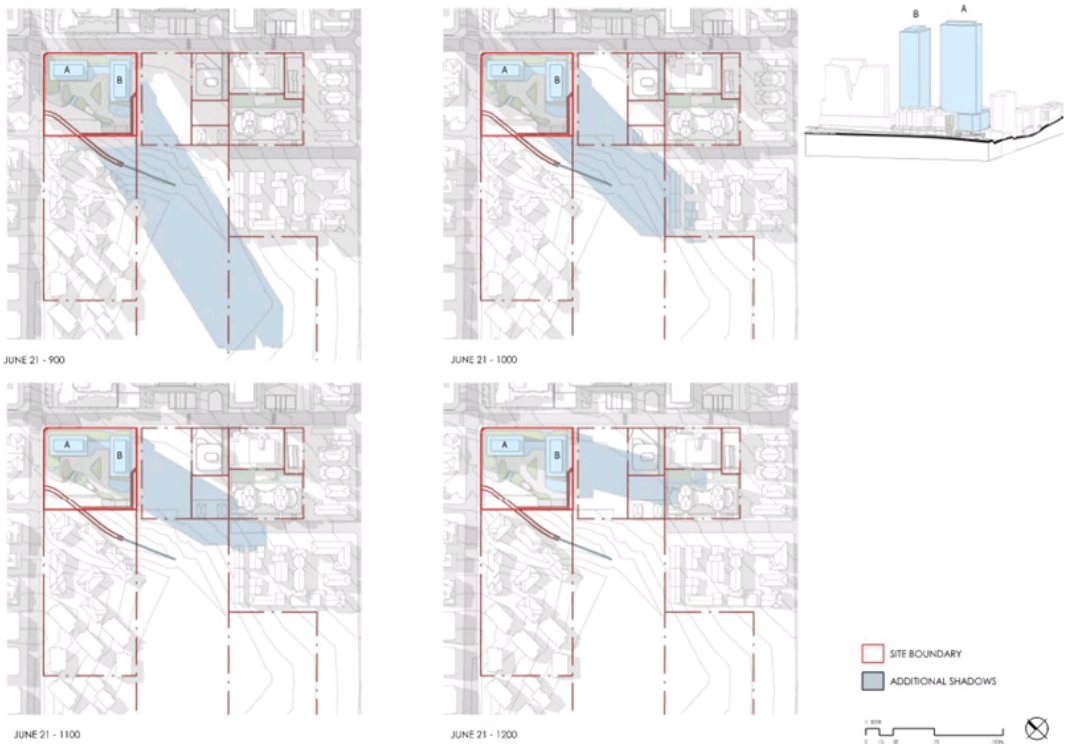


FIGURE 33 – OVERSHADOWING DIAGRAMS
Source: Kann Finch

OPEN SPACE AND PUBLIC DOMAIN

The proposal is supported by a landscape strategy prepared by Arcadia (**Appendix 3**), which proposes a concept drawn from local landscape and the Delvins Creek catchment. The concept proposes a diverse range of open space and landscape areas distributed across the site and include the following strategies:

- Introduce a landscaped frontage to Carlingford Road, integrating new open space into existing public areas,
- Create a sympathetic landscaped edge along Carlingford Road, matching the character of Boronia Gardens,
- Plant new street trees along Rawson Street,
- Enhance the central retail atrium with integrated landscaping, improving visual appeal and creating a sense of place,
- Provide landscape screening and deep soil areas along the western boundary to visually screen neighbouring residential development,
- Develop a diverse native landscape setting in the northwest corner, including a bush play zone and water element, and
- Design high-quality landscaped communal open spaces above the podium for residential apartments.

In addition, the public domain plan allows for a future pedestrian connection from Carlingford Road into Boronia Park. This will support improved pedestrian access to open space and provide a green link to the proposed open space area in the north west corner of the site.

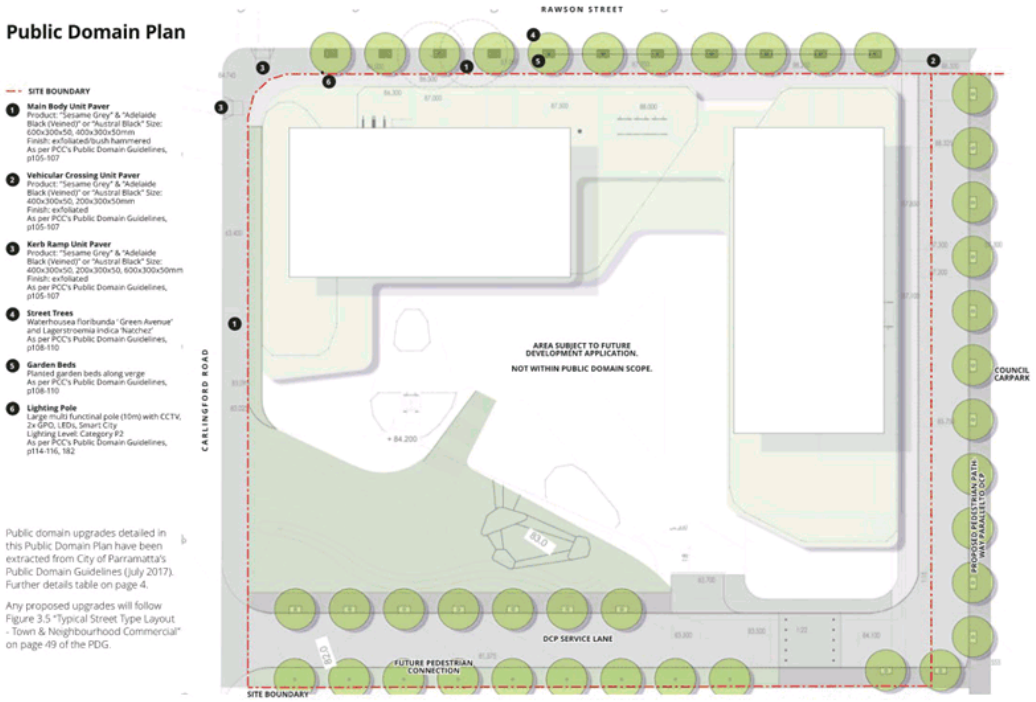


FIGURE 34 – PUBLIC DOMAIN PLAN
Source: Arcadia

These open space areas amount to 4,600m^2 (50%) of the ground plane being publicly accessible and include a generously sized park 1,230m^2 (13.5%).

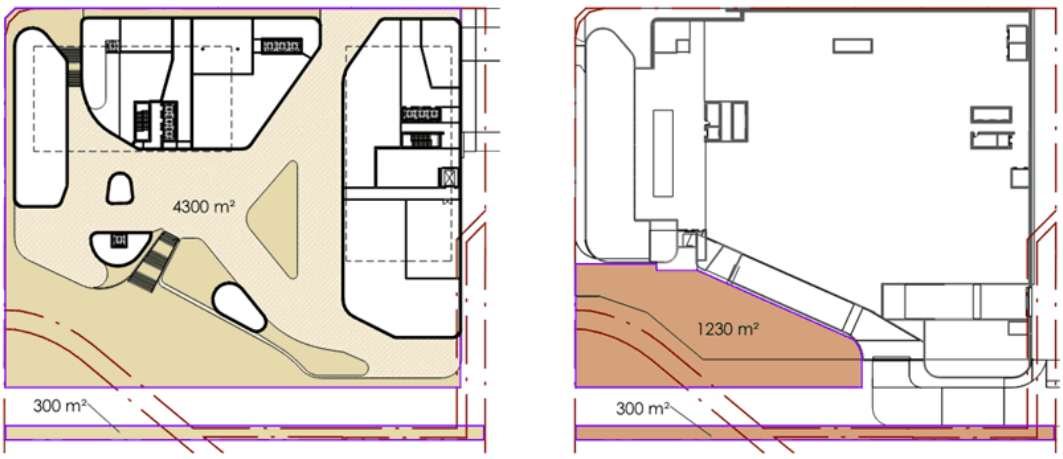


FIGURE 35 – GROUND PLANE PUBLICLY ACCESSIBLE SPACE (LEFT) AND DEEP SOIL (RIGHT)
Source: Kann Finch

TRAFFIC AND TRANSPORT

A TIA has been prepared by Stantec (**Appendix 4**), which provides traffic assessment of the proposal including trip generation, sustainable transport measures, compliance with DCP rates and traffic

generation. A summary of the TIA is provided below, which has been updated to reflect the refined massing post lodgement.

The design currently allows for a single consolidated driveway along the southern boundary of the site at Rawson Street aligned with the DCP 2011 service lane. In accordance with DCP 2011, the service lane could be extended along the western boundary of the site to Carlingford Road. As confirmed by the Flood Assessment Report prepared by GRC Hydro, the service lane is subject to flooding events and hence is not recommended for use by general vehicles.

Notwithstanding, it is recommended the service lane is open for use by service vehicles to remove service vehicles from Rawson Street and separate these movements from general vehicles accessing the basement car park and pedestrians travelling along Rawson Street, with controls in place to close the service lane during flooding events.

The proposal incorporates around 556 parking spaces over five basement levels. The car park will provide parking for residents, staff and visitors with access control (roller doors/ boom gates) to ensure secure access and separation of users.

The proposed development could be expected to generate in the order of 309 and 559 vehicle trips respectively in the AM and PM peak hours (including service vehicle trips). When considering that 25 per cent of retail traffic is passing trade and hence while they are included in the total generation, they are not "new" trips on the road network, the development results in 273 and 450 "new" vehicle trips respectively in the AM and PM peak hours.

The proposed traffic anticipated to travel through the key surrounding intersections is expected to be minor, contributing up to three per cent additional traffic compared to existing traffic volumes.

The proposed site will have a net increase in vehicle generation of around 132 and 138 new vehicle trips respectively in the AM and PM peak hours compared to existing land uses on site. For the purpose of modelling the traffic impact of the development, the proposed redevelopment has been assessed based on having a net increase in vehicle generation of around 144 and 146 vehicle trips respectively in the weekday AM and PM peak hours. The differential in traffic uplift is based on the existing commercial building with ground floor retail generating low traffic volumes (one and nine vehicle trips during each peak hour), however the new commercial and specialty retail land use is assessed based on full traffic yield as per traffic generation rates agreed with Transport for NSW and Council.

The existing pedestrian crossing along Rawson Street on the southern edge of the Council car park currently operates near or at capacity during weekday peak hours during the high pedestrian volumes traveling to / from the rail and bus interchange at Beecroft Road. The development proposes to deliver pedestrian operated signals to better manage the flow of traffic and pedestrians. These signals present a significant benefit to the operation of Rawson Street generally during peak periods and would improve access to both existing and future development within the town centre.

The traffic assessment considers uplift in background traffic generated by potential developments within Epping Town Centre, resulting in a further uplift of 249 and 296 vehicles in the weekday AM and PM peak hour.

Traffic analysis presented in this report indicates it is clear the development has a relatively minor impact on the operation of surrounding intersections, with or without background traffic growth from developments within the town centre, with exception of the Carlingford Road/ Rawson Street/ Ray Road intersection during the AM peak hour specifically due to the limited capacity of the right turn from

Rawson Street to Carlingford Road to accommodate an uplift in traffic. Notwithstanding, the provision of a third eastbound lane along Carlingford Road between Rawson Street and Beecroft Road would result in increased capacity for vehicles exiting Rawson Street and allow for similar performance of the intersection under following development of the site, however, may not deliver enough capacity to accommodate all potential development within the town centre.

In the context of the broader aspirations surrounding development within Epping, as well as aspirations surrounding development that promotes sustainable travel given proximity to a rail and bus interchange and integrated land uses that co-locates jobs, housing and retail, thereby containing trips internally to Epping, the impacts of the planning proposal can, on this assessment be satisfactorily managed.

FLOODING

A Flood Assessment has been prepared by GRC Hydro (**Appendix 5**). GRC Hydro undertook the following methodology to determine the flooding affectations of the site:

- DRAINS hydrologic model to derive flows for the 5% AEP, 1% AEP, 0.5% AEP and PMF using the methodologies as outlined in the ARR 2019,
- TUFLOW hydraulic model to derive water levels, depths, velocities, and hazard for the 5% AEP, 1% AEP, 0.5% AEP and PMF of existing conditions,
- Assess the flood conditions and risks of existing and proposed conditions and review model results,
- Model the proposed plan and assess the flood impacts,
- Review pertinent planning documentation for applicable flooding controls, and
- Develop flood maps which present and proposed flood depth, level and hazard for each event, and flood level impacts for 1% AEP event.

GRC Hydro state the preferred masterplan has been deliberately situated outside areas of significant flow in the 1% AEP event and as such, there will be no impacts on flood behaviour as a result of the planning proposal.

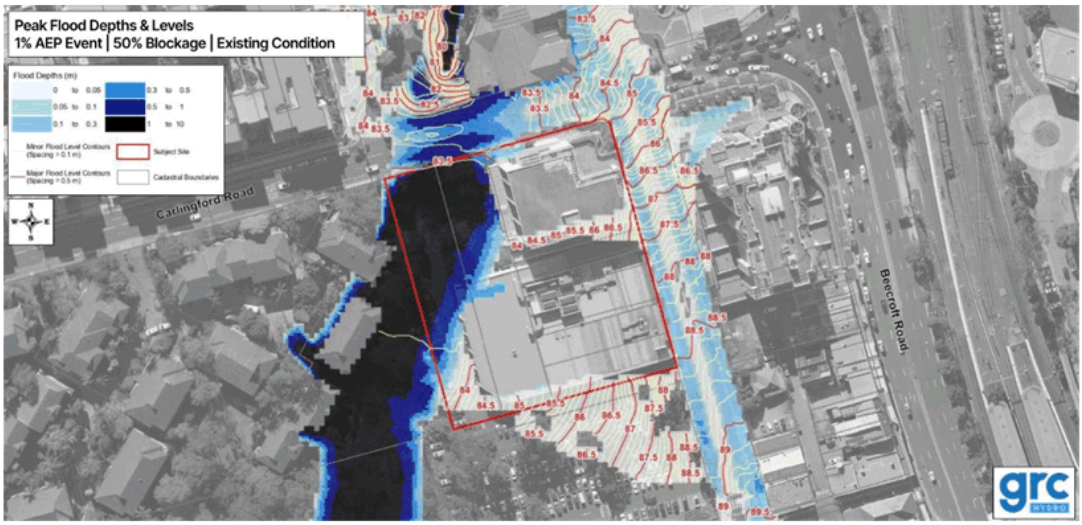


FIGURE 36 – PEAK FLOOD DEPTHS AND LEVELS – 1% AEP EXISTING CONDITION
Source: GRC Hydro

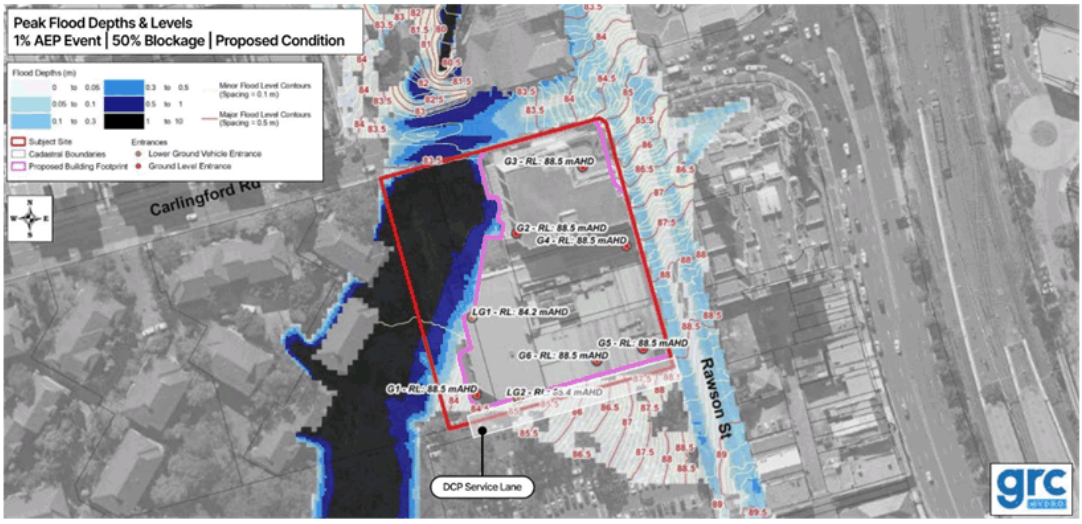


FIGURE 37 – PEAK FLOOD DEPTHS AND LEVELS – 1% AEP POST DEVELOPMENT CONDITION
Source: GRC Hydro

GRC Hydro have reviewed the preferred masterplan relative to several planning instruments including PLEP 2023, PDCP 2011 and the relevant ministerial directions. These include:

- The planning proposal demonstrates consistency with the controls and objectives of PLEP 2023 and DCP, as well as demonstrating the proposal is consistent with the *NSW Floodplain Development Manual 2005*.
- The planning proposal meet the relevant flood planning levels and off-site impact requirements. Egress via Rawson Street avoids all interaction with hazardous mainstream flooding.
- The key principles of the *Floodplain Development Manual 2005* are that no development should occur in floodway, floor levels should meet flood planning level requirements and flood risk should be managed. All key three principles are met by the planning proposal and compliance with PLEP 2023 and the DCP further demonstrate this.
- The planning proposal does not result in any impacts on adjacent development in the 1% AEP event.
- The planning proposal and preferred masterplan is not proposed in an area of high hazard. Furthermore, residential levels are significantly elevated above the 1% AEP mainstream flood level of 83.7m AHD at the site.
- Relatively safe egress to Rawson Street is available in evacuation events.

A review of the Panning Proposal and preferred masterplan demonstrates that the planning proposal has considered the site's constraints, with the proposed built form responding to and mitigating any associated impacts resulting from the flood prone land.

Furthermore, a letter has also been prepared by GRC Hydro dated 24 April 2024, which considers the flood impacts of the proposal against the amendments made following post lodgement and the refined

masterplan. The letter confirms that there are no changes that would change the previously presented report or conclusions. GRC Hydro state:

> *…based on the information presented to GRC Hydro that the flood assessment (GRC Hydro 2023), including the risk assessment and outcomes, are still valid with the proposed changes provided by Oakstand on the 23rd April 2024. No changes have been proposed to the key items contributing to the conclusion of the proposed "Epping Town Centre" being of a low flood risk. As such, there is no need to update either the modelling or reporting presented in the 'Epping Town Centre, Flood Assessment for Planning Proposal', Revision C, GRC Hydro, 5th December 2023.*

CONTAMINATION

A PSI has been prepared by Douglas Partners (**Appendix 11**) that considers the suitability of the site for the proposed use. Douglas Partners concludes the site can be made suitable for the proposed development subject to the following:

- Obtain and review the SafeWork NSW records,
- Additional soil sampling and testing to meet a sampling density, combined with the current locations, commensurate with a Detailed Site Investigation (**DSI**) as described in NEPC (2013),
- The additional sampling and testing should preferrable be undertaken following building demolition to facilitate ease of access and visual assessment of fill through test pitting,
- Assessment of groundwater quality beneath the site, and
- Hazardous building material survey of the buildings present on site, prior to demolition; and
- If required following the additional investigations, preparation of a remediation action plan (**RAP**).

PEDESTRIAN WIND

A Pedestrian Wind Environment Statement has been prepared by Wintech to assess the wind effects of the preferred masterplan (**Appendix 9**).

Windtech state that while the preferred masterplan incorporates a range of positive wind mitigation strategies, there are areas of the proposed development that are likely to experience and be exposed to stronger winds. Several recommendations are proposed that are capable of being incorporated into a future DA for the site including:

- Ground level trafficable areas:
    - Retain proposed north-western landscape area with densely foliating tree and hedge planting within.
    - Inclusion of continuous impermeable awning along Rawson Street frontage on Ground level.
    - Inclusion of an impermeable awning at the base of Tower B along the southern aspect on Ground level.
    - Inclusion of an impermeable awning at the base of Tower A along the western aspect on Ground level.
    - Retain proposed landscape areas with densely foliating tree and hedge planting within the central communal open space on Level 1 and at the entrances into the area.
    - Inclusion of a combination of densely foliating evergreen planting, baffle screening along the arcade entrances to the central open communal open space on the Ground Level.

- Elevated communal open spaces (podium)

  - Retain proposed landscape areas with densely foliating tree and hedge planting within.
  - Inclusion of a perimeter screening to a height of 2-2.5m high in between Towers A and B on Level 4.

- Private balconies and terraces
  - Full height impermeable screens or full height louvres along one of the exposed aspects of the corner balconies i.e., single aspect design.

Overall, consideration of the above recommendations is expected to result in suitable wind conditions for various trafficable outdoor areas within and around the development for intended uses, and that wind speeds will satisfy the applicable criteria for pedestrian comfort and safety typical of Epping.

The proponent intends on undertaking further wind tunnel testing at detailed design stages to quantitively assess the wind conditions and to verify the necessity of the treatments and recommendations. This will be further explored at detailed design and DA stage.

SUSTAINABILITY

An ESD Strategy has been prepared by Stantec Australia (**Appendix 8**), which outlines a number of initiatives that will be explored in detailed DA stage to support the NSW Government's targets of Net Zero. Key responses include:

- Site electrification and facilities to enable on-site renewable energy production,
- Rainwater harvesting and reuse,
- Energy efficient lighting systems (internal and external) and lighting controls,
- Façade thermal performance for new elements in line with NCC 2022 Section J,
- Efficient domestic hot water and HVAC system equipment,
- Timer and motion controls of lighting and ventilation to reduce unnecessary energy consumption,
- Explore opportunities to reduce embodied energy reduction associated to construction material selection,
- Increased access to natural daylight with an aspiration to exceed ADG solar access and cross ventilation requirements.
- Water efficient fixtures and fittings (WELS ratings),
- Application of WSUD principles,
- Responsibly sized waste separation and storage areas, and
- Increased indoor environmental quality through the use of low-VOC paints, adhesives and sealants.

The above responses will be explored further by the proponent prior to lodgement of a DA.

Has the planning proposal adequately addressed any social and economic effects?

The proposal will deliver a number of positive social and economic outcomes, thereby ensuring that future on-site residents, workers and visitors have access to retail and commercial amenity, community services and infrastructure, civic amenity in addition to recreation.

SOCIAL IMPACTS

An SIA has been prepared by Cred Consulting (**Appendix 7**), which provides an audit of social infrastructure within 200m, 400m, 800m and 2km of the site. These are shown in **Figure** 36. Overall, the site is well located within an existing strategic centre and has a range of local, district and regional facilities within 200m to 2km of the site.

The following levels of infrastructure were audited for each proximity benchmark distance:

- Local facilities - Within 800m of the site,
- District facilities - Within 2km of the site, and
- Regional facilities - Within 5km of the site.

An audit of public facilities shows that:

- Within 800m of the site, there are 4 local facilities,
- Within 2km of the site, there are 9 district facilities., and
- Within 5km of the site, there are 4 regional facilities.

FIGURE 38 – LOCATION OF SOCIAL INFRASTRURE WITHIN 2KM OF THE PROPOSAL
Source: Cred Consulting

Infrastructure demand

Based on the findings of the SIA, demand for social infrastructure generated by the proposal are as follows:

- **Library Floor Space** - Benchmarked demand of 190m^2 of library space is likely to be generated through planning proposal. City of Parramatta's Community Infrastructure Strategy (COPCIS) indicates that for Catchment Three (which Epping suburb is located within) there is a gap of 1,014m^2 of library space in 2019. The Epping Library and Leisure Centre has recently undergone refurbishment, including the addition of a new floor level, to address increased library space demand for the area.

- **Early education and care** – Benchmarked demand for 21 places is likely to be generated by the proposal. The proposed demand does not trigger a need for an on-site facility.

- **Out of School care** – Benchmarked demand for 19 places is likely to be generated by the proposal. The proposed demand does not trigger a need for an on-site facility.

- **Public Hospital Beds** – Benchmarked demand for 2.8 hospital beds is likely to be generated by the proposal.

- **Open Space** - Benchmarked demand for 3.2 ha. of public open space is likely to be generated by this proposal. Currently, there is a provision of approximately 50 ha. of public open space in the Epping suburb. In 2021, there is demand for an additional 40 ha in the suburb. The planning proposal includes 0.11 ha of public open space (including park). Therefore the planning proposal will generate an additional demand of 3.09 ha. of public open space for the Epping suburb.

- **Indoor recreation centre –** The proposal does not trigger benchmarked need for a facility on-site. There is a benchmarked demand for 1 indoor recreation centre for the Epping suburb in 2021.

- **Skate Facilities –** The proposal does not trigger benchmarked need for a facility on-site. There is a benchmarked demand for 3-6 skate facilities for the Epping suburb in 2021.

- **Multipurpose outdoor courts –** The proposal does not trigger benchmarked need for a facility on-site. The COPCIS indicates that there is a moderate gap in hard courts in the suburb of Epping.

- **Outdoor fitness station –** The proposal does not trigger benchmarked need for a facility on-site. The COPCIS indicates that the current provision in Epping meets the benchmarked need for outdoor fitness stations.

- **Play spaces** – Benchmarked demand for 0.5 play spaces is likely to be generated through by this proposal. The COPCIS indicates that there are currently 9 play spaces in the Epping suburb. It also indicates that for Catchment Three (which Epping suburb is located within) there is a gap of 3 play spaces in 2019. Currently one play space is proposed as part of the planning proposal. Therefore provision meets demand.

- **Indoor Courts –** The proposal does not trigger benchmarked need for a facility on-site. The COPCIS indicates that the current provision in Epping meets the benchmarked need for indoor courts.

- **Aquatic facilities (local) –** The proposal does not trigger benchmarked need for a facility on-site. The COPCIS indicates that the current provision in Epping meets the benchmarked need for aquatic facility courts.

- **Dog off-leash areas** – The proposal does not trigger benchmarked need for a facility on-site. There are 4 dog off-leash areas for the suburb of Epping.

It is acknowledged that the future development of the site will require the payment of 7.11 contributions which will contribute towards additional social infrastructure demand as generated by the proposal. Priority community needs are identified in Table 9 of the SIA.

Social impacts

Chapter 6 of the SIA provides a summary of the social impacts of the planning proposal as well as potential mitigation measures to address issues and enhance positive social impact. This has been summarised in the **Table 13** below.

TABLE 12 – SOCIAL IMPACTS

IDENITIFIED SOCIAL IMPACT		ENHACEMENT/MITIGATION MEASURES
POSITIVE IMPACTS		
1. Supply of additional housing	The proposal will provide an additional 420 apartments, which may cater to smaller household sizes within the Epping suburb, including working age population.	Provide a minimum of 20% 3 bedroom apartments, to cater for the large proportion of families with children who reside in Epping suburb.
2. Publicly accessible public open space	The lower ground level is designed to accommodate a range of activities for people of all age groups. This includes bush play zones, flexible communal open space with lawn, seating and alfresco dining.	Provide adequate wayfinding signage, universally designed seating and landscaping, noise mitigation measures for residential tenants.
3. Improved pedestrian access after construction	The planning proposal provides wide footpath, thoroughfares and multiple access points into the ground level for pedestrians.	Wide footpath on Rawson Street with end of trip facilities and opportunity for walking loop as part of Boronia park.
4. Access to Boronia park	The planning proposal retains access to nearby carpark which leads to Boronia Park.	Opportunities to enhance direct link to Boronia park, provision of amenities (e.g. drinking fountain and seating) and signage.
5. New full line modern supermarket with supporting speciality retail post construction	The planning proposal proposes to demolish the existing supermarket and build a new one with supporting specialty retail.	Incorporation of best practice universal design principals, provision of seating, opportunity for art displays.
6. Rawson Street and Carlingford Road activation post construction	The planning proposal will change the existing character of the town centre through the delivery of mixed-use towers with supermarket on lower	Provide places to 'stay' in the public domain, provide natural areas which soften the urban landscape, enhance active transport connections.

IDENITIFIED SOCIAL IMPACT		ENHACEMENT/MITIGATION MEASURES
	ground level and retail on ground level.	
7. Provision of additional retail and commercial space within close proximity to Epping Station	The planning proposal will add additional retail and commercial space, helping to make a retail destination on the western side of Epping.	Opportunity to incorporate subsidised space as part of commercial/retail offering for community benefit (e.g. dedication of retail space for a social enterprise such as a café)
8. Employment opportunities	During and after construction, this mixed-use planning proposal will provide opportunities for local employment in the Epping high growth area, close by to public transport.	NA
9. Communal open space	This proposal includes communal open space for use by residents.	Embellish communal open space with high quality amenities, ensure regular maintenance.
10. Communal space	The planning proposal will include a community space of 775m² adjoining the communal open space on Level 1.	Ensure space is bookable, design to be multi-purpose and take advantage of proximity to communal open space, engage with community to determine purpose, form and function.
11. Connection to Country	Initial consideration of Connection to Country as part of the design of the podium/ plaza and landscaping	Explore opportunities to strengthen Connection to Country interpretation.
NEGATIVE IMPACTS		
1. Pressure on existing social infrastructure	The social infrastructure proposed by the Planning Proposal does not meet all community needs generated by the proposed development and therefore new residents will add additional pressure on the existing social infrastructure in Epping suburb.	Consider contributions towards priority community needs through Section 7.11 and Housing productivity contributions.
2. No proposed provision of affordable housing	The Planning Proposal in its current form does not incorporate provision of affordable housing.	There is opportunity to provide affordable rental housing as part of future development of the site.
3. Limited Pedestrian access	Pedestrian access in and around Rawson Street is likely to be affected during construction, impacting wayfinding.	Provide appropriate notice to affected stakeholders, provide alternate wayfinding routes, enhance active transport connections.
4. Noise during construction	Noise during the construction period may impact on the quality of life of neighbouring residents.	Provide appropriate notice and contact details to affected community members.
5. Temporary closure of supermarket	During construction, it is likely that Epping residents, workers and visitors will not be able to access the existing supermarket,	Provide appropriate notice to affected stakeholders including construction timeframes

IDENITIFIED SOCIAL IMPACT		ENHACEMENT/MITIGATION MEASURES
during construction	which would be a significant but temporary impact on the existing local community, workers and visitors.	

A SIA Addendum was prepared by Cred Consulting in response to the refined masterplan following lodgement. It notes that the main change has been the consolidation of three to two tower forms and increased commercial floor space and publicly accessible domain.

Cred Consulting maintains that the impacts identified in the original report remain valid and notes:

> *The recent changes to the planning proposal align with Council's strategic goals for the area, which ads another positive social impact to the development. Additionally, all other social impacts, enhancement suggestions , and mitigation measures identified in the 2023 report remain valid.*
>
> *Overall, the social impact assessment for the planning proposal remains overwhelmingly positive and is supported.*

ECONOMIC IMPACTS

An EIA has been prepared by Atlas Economics (**Appendix 6**) to assess the need for the land uses proposed and examine the economic impacts of the planning proposal. This report has been updated to reflect the refined massing with a non-residential FSR of 1.5:1.

Changing role of Epping and site response

Atlas state that Epping centre was historically a minor suburban commercial market that offered lower priced office space that was attractive to local businesses and business owners who lived locally and sought to work close to home.

As high-density development has displaced many of the commercial buildings, the centres role has evolved to become one that provides for local services and that fulfills a convenience role. This is evident from the change in employment profile observed over the 2011-2021 period, with health and education-related employment growing in proportion.

Based on the business occupier profile and activity, the demand for commercial space is broader than just demand for office floor space. The tenancy profile of businesses currently accommodated on the Site (various education and tutoring centres, specialist medical practices) is indicative of the spread of demand for commercial floor space in the centre.

Atlas go on to state that at present, the centre has a Coles supermarket and some minor specialty shops but overall has a limited retail offer. Residents generally travel to Macquarie Park, Carlingford, Eastwood or Beecroft to have their convenience retail needs met.

Furthermore, the EIA notes the centre is in a state of transition, with large scale development activity revealing:

- A much larger residential population, with many commuting to Sydney CBD and Macquarie Park for work,
- A fall in local employment as former commercial buildings have been redeveloped, and
- A growth in local employment in education and training and notable decline in retail employment.

While developments in the centre have resulted in a large number of new households and residents, many of the sites are small in area. This limits the ability for large scale provision of retail/commercial floor space that would enable retail uses to cluster and that would be overall feasible. This reality can be observed from developments in the pipeline and developments that have already been completed where only there is only minor provision of commercial space and employment.

The site therefore plays an important role in contributing to the Epping's capacity to enable local residents to have their convenience, shopping and recreational needs met. This would contribute to improving the self-containment of the centre and reducing trips beyond the centre except for higher-order shopping.

Economic assessment

During the construction phase the planning proposal is expected to generate significant economic impacts for the LGA including:

- $407.1 million in output (including $237 million in direct activity),
- $147.4 million contribution to GRP (including $60.6 million in direct activity),
- $83 million in incomes and salaries paid to households (including $40.3 million in direct income), and
- 855 FTE jobs (including 449 FTE directly employed in construction activity).

During the operational phase the planning proposal is expected to result in a net increase in economic activity through direct and indirect (flow-on) annually at:

- $164.2 million in additional output (including $88.5 million in direct activity),
- $88.6 million in additional contribution to GRP (including $46.8 million in direct activity),
- $51.1 million in additional incomes and salaries paid to households (including $31.6 million in direct income), and
- 493 additional FTE jobs (including 311 FTE jobs directly related to activity on the site).

The Proposal is also expected to generate additional household expenditure supported through new dwellings within the Parramatta LGA. This activity is estimated to support on an ongoing annual basis (once fully developed and occupied):

- $59.7 million in total output ($35.2 million directly)
- $34.7 million additional in contribution to GRP (including $21.2 million in direct activity),
- $14.6 million additional incomes and salaries paid to local workers (including $8.2 million directly), and
- 187 FTE jobs (including 128 additional FTE jobs directly related to activity on the site).

Overall, Atlas concludes the proposal will make a significant contribution to the Parramatta economy. The planning proposal is expected to generate an annual GRP of $88.6 million to the local economy and support almost 311 FTE jobs on-site during operational phase.

The planning proposal will contribute to meeting demand for retail and local commercial services including the growing health and education-related businesses seeking to locate in the centre. Importantly, it will facilitate better self-containment in terms of trip generation and contribute to an increase in provision of much-needed contemporary commercial floor space.

The economic impacts estimated demonstrates the planning proposal has economic merit, having the ability to reinforce the functionality of Epping as a Strategic Centre and contribute significantly to the local economy.

7.4 Section D – Infrastructure (Local, State and Commonwealth)

Is there adequate public infrastructure for the planning proposal?

The proposal is located in an established, urban area and as such, existing services and utilities are available and can readily accommodate future development.

Nonetheless, the proposal is accompanied by an Electrical and Hydraulic Services Infrastructure Report, prepared by Stantec (**Appendix 10**), which confirms the following findings:

- Augmentation will be required to provide power to the site, It will be necessary to decommission and remove the 2 off existing substations and replace with new chamber substations (3 x 1500kVA transformers required to service the site).
- The proposed development is well serviced from existing Carrier infrastructure. No carrier diversions are required and it is not expected that there will be any carrier backhaul charges.
- The authority sewer infrastructure surrounding the site is of sufficient capacity to service the proposed development. The sewer assets will be subject to alterations and deviations to allow for the construction of the development.
- The authority water infrastructure surrounding the site is of sufficient capacity to service the proposed development.
- Formal applications will need to be undertaken The authority gas infrastructure surrounding the site has sufficient capacity to service the needs of the proposed development. Formal applications will need to be undertaken

Based on the above, the proposal notes that existing services are able to accommodate the site. Nonetheless, further investigations will be undertaken to determine whether any upgrade of existing facilities is necessary in consultation with Council and service providers.

Refer to the Electrical and Hydraulic Services Infrastructure Report in **Appendix 10**.

7.5 Section E – State and Commonwealth Interests

What are the views of the State and Federal public authorities and government agencies consulted in order to inform the Gateway determination?

Consultation has occurred with a number of State authorities including the Department, Council and TfNSW as part of the scoping report and pre-consultation processes.

In particular, Council referred the scoping report to TfNSW on 13 February 2023, with a response provided on 29 March 2023. A copy of this correspondence is provided at **Appendix 12**. Overall, the consultation did not identify any major issues that would preclude an amendment to PLEP 2023.

Prior to preparation of the traffic analysis, the proponent's traffic consultant (Stantec) liaised with TfNSW and Council to provide input on the proposed transport methodology/assumptions. This includes requests for concurrence on traffic generation rates and traffic growth assumptions. A summary of correspondence with stakeholders is detailed in Table 1.2 and Appendix A of the TIA (**Appendix 4)**.

Consultation will continue during the course of Council's review of the planning proposal, Department assessment and in accordance with any conditions and engagement requirements set by the Gateway Determination.

8 Part 4 – Maps

The planning proposal seeks to amend the following maps of the Parramatta Local Environmental Plan 2013 as follows:

TABLE 13 – PROPOSED MAP CHANGES

CONTROL	EXISTING	PROPOSED
Height of Buildings	48m	Various RLs to reflect future towers (RL 206, 130 and 197). Refer to **Figure 37.**
Special Provisions Area Map	NA	Include site in Special Provisions Area map with an accompanying local provision that allows for FSR to exceed those outlined in clause 4.3. Refer to **Figure 38**.

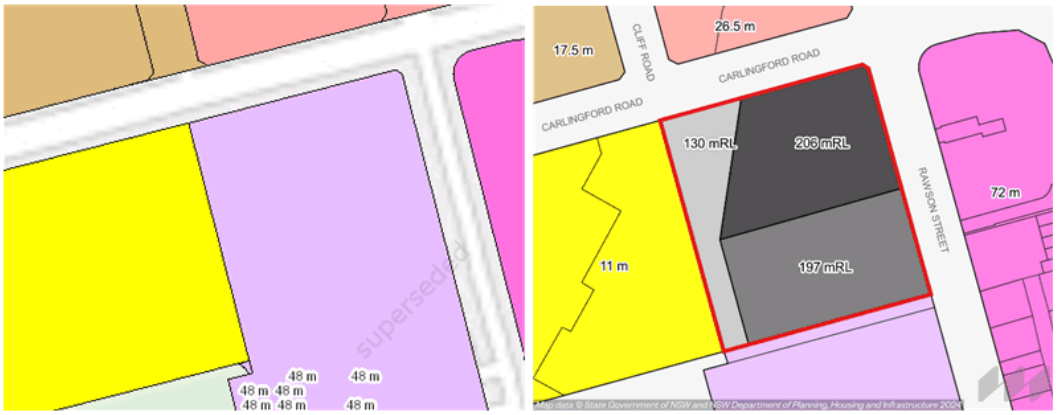


FIGURE 39 – EXISTING (LEFT) AND PROPOSED (RIGHT) HEIGHT OF BUILDINGS MAP
Source: Mecone

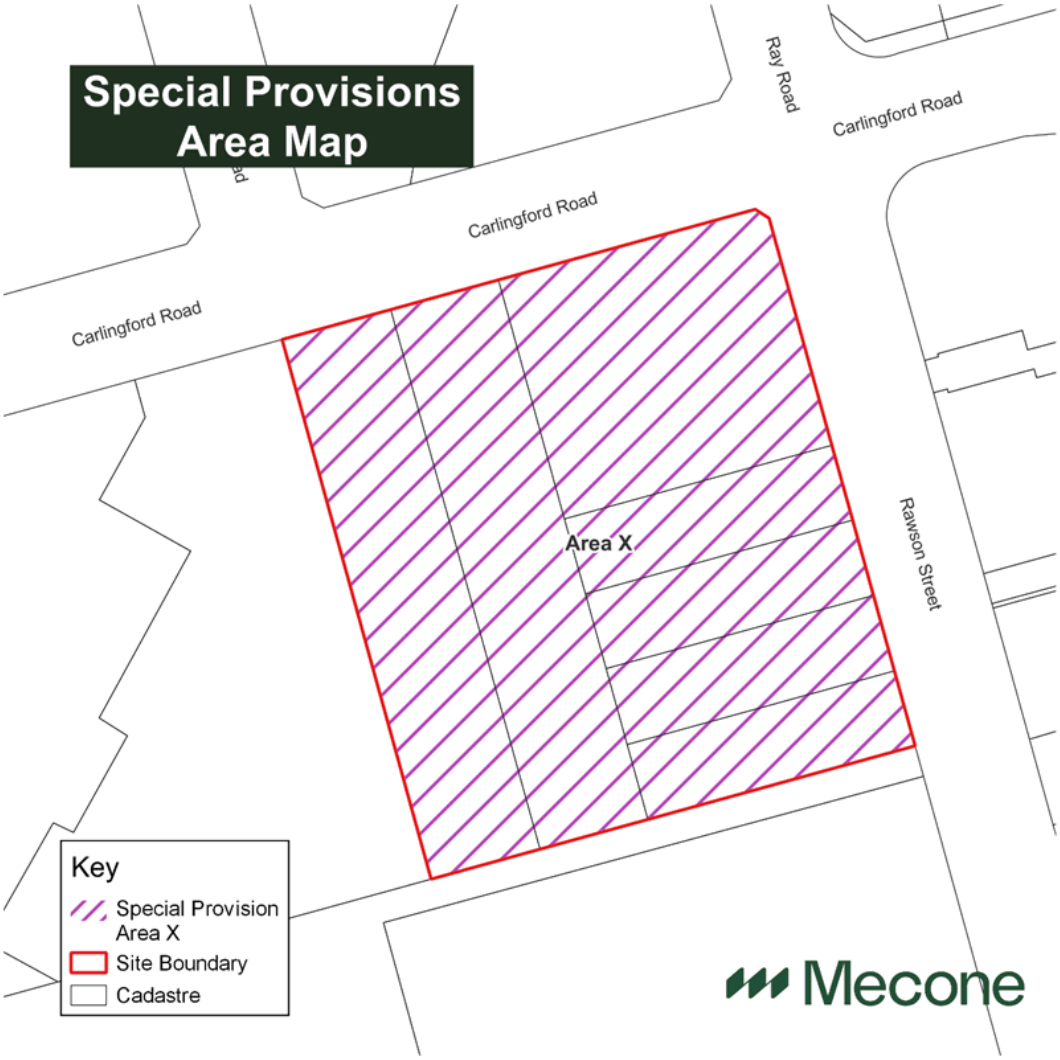


FIGURE 40 – PROPOSED SPECIAL PROVISIONS AREA MAP
Source: Mecone

9 Part 5 – Community consultation

The planning proposal will be placed on public exhibition in accordance with the Gateway Determination, should the Department support the proposal. Confirmation of the public exhibition period and requirements for consultation will be detailed as part of the Gateway Determination.

Any further community consultation will be conducted in accordance with Sections 3.33 and 3.34 of the EP&A Act, the Guidelines and Council's policies. This may involve:

- Public exhibition of the planning proposal including:
- Notification on Council's website,
- Notification in writing to affected and adjoining landowners, unless Council is of the opinion that the number of landowners makes it impractical to notify them,
- Notification letters to relevant State agencies and other authorities nominated by the Department, and
- Undertaking of any other consultation methods appropriate for the proposal.

Any further detailed design DA for the site would also be exhibited in accordance with Council's requirements, at which point the public and any authorities would have further opportunity to comment on the proposal.

10 Part 6 – Project timeline

A primary goal of the plan making process is to reduce the overall time taken to gazette LEPs. The Gateway Determination will confirm the level of information necessary to support the planning proposal and the consultation requirements.

In order to meet these timeframes, the inclusion of a project timeline in the planning proposal will provide a mechanism to monitor the progress of the planning proposal through the plan making process.

The table below provides the project timeline anticipated for the subject planning proposal, which is proportionate to the nature and scale of the proposal.

TABLE 14 – PROJECT TIMELINE

STAGE	TIMING
Consideration by Council	May 2024
Council decision	June 2024
Gateway determination	October 2024
Commencement and completion of public exhibition period	November – December 2024
Consideration of submissions	February 2025
Post-exhibition review and additional studies (if required)	April 2025
Submission to the Department for finalisation	May 2025
Gazettal of the LEP amendments	June 2025

11 Conclusion

This planning proposal has been prepared by Mecone on behalf of Canjs Pty Ltd to establish a new planning control framework for the site at 53-61 Rawson Street, Epping. It provides a full justification of the proposal and has been prepared in accordance with:

- Section 3.33 of the EP&A Act; and
- The Guidelines dated August 2023.

The site represents a key opportunity landholding in the heart of a Strategic Centre and within walking distance to major transport infrastructure investment in a high density location. It represents positive urban renewal outcomes completely in alignment with the Region Plan, District Plan and LSPS.

The planning proposal expressly meets and delivers new housing supply and employment opportunities in a manner expected by Council's LSPS and will assist Epping in reaching its targets by 2036. In particular, the planning proposal fulfills the stated role and purposes of Strategic Centres, as established in the District Plan.

- High levels of private sector investment,
- Flexibility, so that the private sector can choose where and when to invest,
- Co-location of a wide mix of activities, including residential,
- High levels of amenity, walkability and being cycle-friendly, and
- Areas identified for commercial uses, and where appropriate, commercial cores.

It will facilitate Council's objectives for Epping as a key Strategic Centre, supported by appropriate levels of employment floor space and high quality open space and amenity. It has been the subject of evidence-based urban design testing and analysis that aligns with State and local objectives to achieve a high quality place supported by open space and civic amenity.

Additionally, economic modelling indicates the proposal will make a significant contribution to Parramatta's economy, generating an annual GRP of $88.6 million to the local economy and supporting up to 311 FTE on-site. It will contribute to meeting demand for retail and local commercial services and facilitated reduced 'escaped expenditure' and travel to other centres.

The planning proposal exhibits strong strategic merit and represents a clear line of sight between State and local strategic planning objectives. It is consistent with the following key priorities of the District Plan:

- C1 – Planning for a city supported by infrastructure,
- C2 – Fostering healthy, creative, culturally rich and socially connected communities,
- C5 – Provide housing supply, choice and affordability, with access to jobs, services and public transport,
- C9 – Delivering integrated land use and transport planning and a 30-minute city,
- C10 – Growing investment, business opportunities and jobs in strategic centres,
- C16 – Increasing urban tree canopy cover and delivering Green Grid connections, and
- C7 – Delivering high quality open space.

The planning proposal is also entirely consistent with planning priorities and actions contained in the LSPS:

- Planning Priority 4: Focus housing and employment in the GPOP and Strategic Centres; as well as stage housing release consistent with the Parramatta Local Housing Strategy (when endorsed),
    - Focus high-rise development in Parramatta CBD and Strategic Centres (Epping and Sydney Olympic Park) as shown on the Structure Plan Map,
- Planning Priority 11: Building the capacity of the Parramatta CBD, Strategic Centres, Local Centres and Employment Lands to be strong, competitive and productive, and
- Action 69: Advocate for the recommendations of Epping Town Centre Review (when completed) and implement the adopted recommendations.

The planning proposal demonstrates site-specific merit through delivery of additional non-residential floor space commensurate with increased heights to support the renewal of the site. The basis of the proposal is commercial floor space and a non-residential FSR of 1.5:1 supports the renewal of 4.5:1 residential. It ensures future renewal does not erode residential capacity in Epping but delivers true mixed use outcome with a full-line supermarket and associated specialty retail offerings as a catalyst for the main street precinct.

The planning proposal exhibits site-specific merit for the following reasons:

- **Employment generation** – the site is a strategic opportunity for Epping to facilitate positive urban renewal, revitalise and expand the existing full-line Coles Supermarket and specialty retail. As described throughout this report, there is an under-provision of supermarket offerings in Epping and sites available to support commercial floor space and jobs. The proposal is estimated to generate 493 additional FTE jobs, including 311 directly related to the activity on the site.

- **A major site in a Strategic Centre** – comprehensive analysis of other sites in Epping centre conclude the site is the only viable and significant landholding capable of delivering a significant non-residential floor space in tandem with the creation of a key retail destination on the western side of Epping. The proposed built form is justifiable from a planning perspective for the following reasons:

    - The proposed heights are comparable to existing approved developments on the eastern side of Epping and will balance the centres skyline profile,
    - The masterplan went through Council's DEAP prior to lodgement, which confirmed the heights and massing were considered acceptable. While the proposal has been refined post-lodgement, the premise for additional density of this site remains valid,
    - The site is unique in its size and lot configuration in facilitating a full-line supermarket and specialty retail, which could not be accommodated elsewhere in Epping,
    - The height reflects the provision of an additional 1.5:1 of non-residential FSR, which has been a key driver for the proposal and aligns with Council's long-standing vision to see Epping become a major employment hub, and
    - The minor flood affectation on the north western corner of the site has limited the developable area for built form, which has resulted in additional height to utilise the FSR proposed. This has equally turned into a major site opportunity in enhancing publicly accessible open space for visitors and residents, while also managing transition to adjacent areas.

- **Compatible land use and built form** – extensive urban design review and testing has been undertaken with Council's DEAP and the internal urban design team following lodgement, which has resulted in the creation of a compatible urban form within the context of a high

density strategic centre, whilst also ensuring high levels of amenity are achieved for future occupants including exceeding ADG criteria and generating minimal off-site impacts.

- **No environmental constraints** – there are no environmental constraints that would limit or act as a barrier to the site's redevelopment. Where flooding is identified, this is easily accommodated in the future proposal and preferred masterplan.

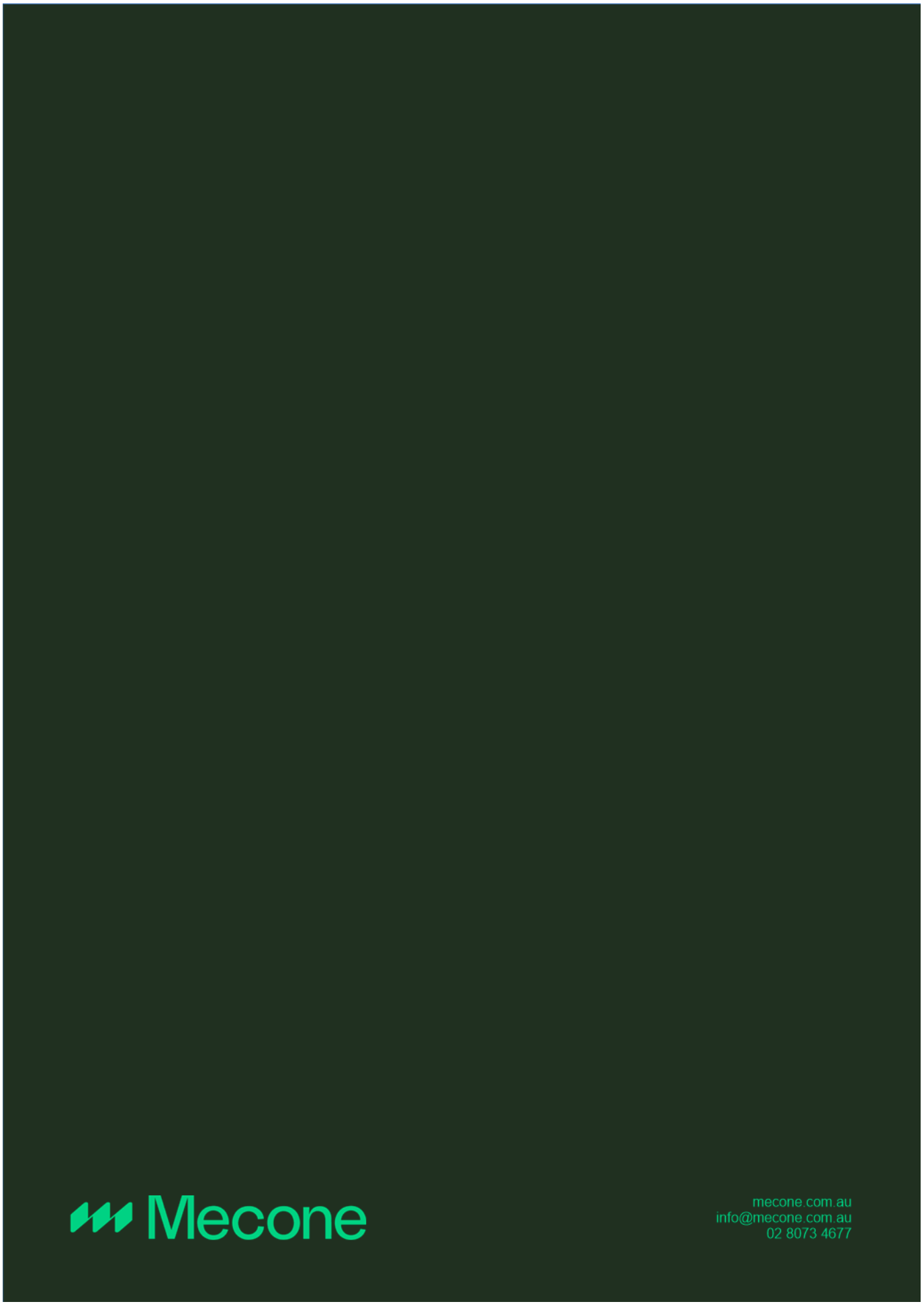
- **Open space** – the site delivers a generously sized park, which represents 13.5% of the site area. This park will be publicly accessible for residents in Epping to use and will be supported by complementary civic plazas and activated retail on the site.

- **Active and public transport** – the site supports integrated land use and transport planning, being located within 200m of Epping train station, metro and bus network. It will reduce unnecessary vehicular trips to other competing retail centres including Beecroft, Top Ryde, Macquarie Park and Carlingford Court.

- **Minimal traffic impacts** – From a transport perspective, the proposed development does not raise specific issues with respect to impacts on the area or transport network nor unnecessarily affect existing land uses. It realises a definitive need for mixed -use developments within Epping and encourages a decrease in car dependency and uptake of sustainable transport.

  The proponent's traffic consultant (Stantec) liaised with TfNSW and Council to provide input on the proposed transport methodology/assumptions prior to lodgement and ensures gaps in previous traffic analysis for Epping Town Centre are addressed in respect to this site-specific planning proposal.

- **Infrastructure and services** – there is adequate community and utility infrastructure to support the proposal.


Mecone
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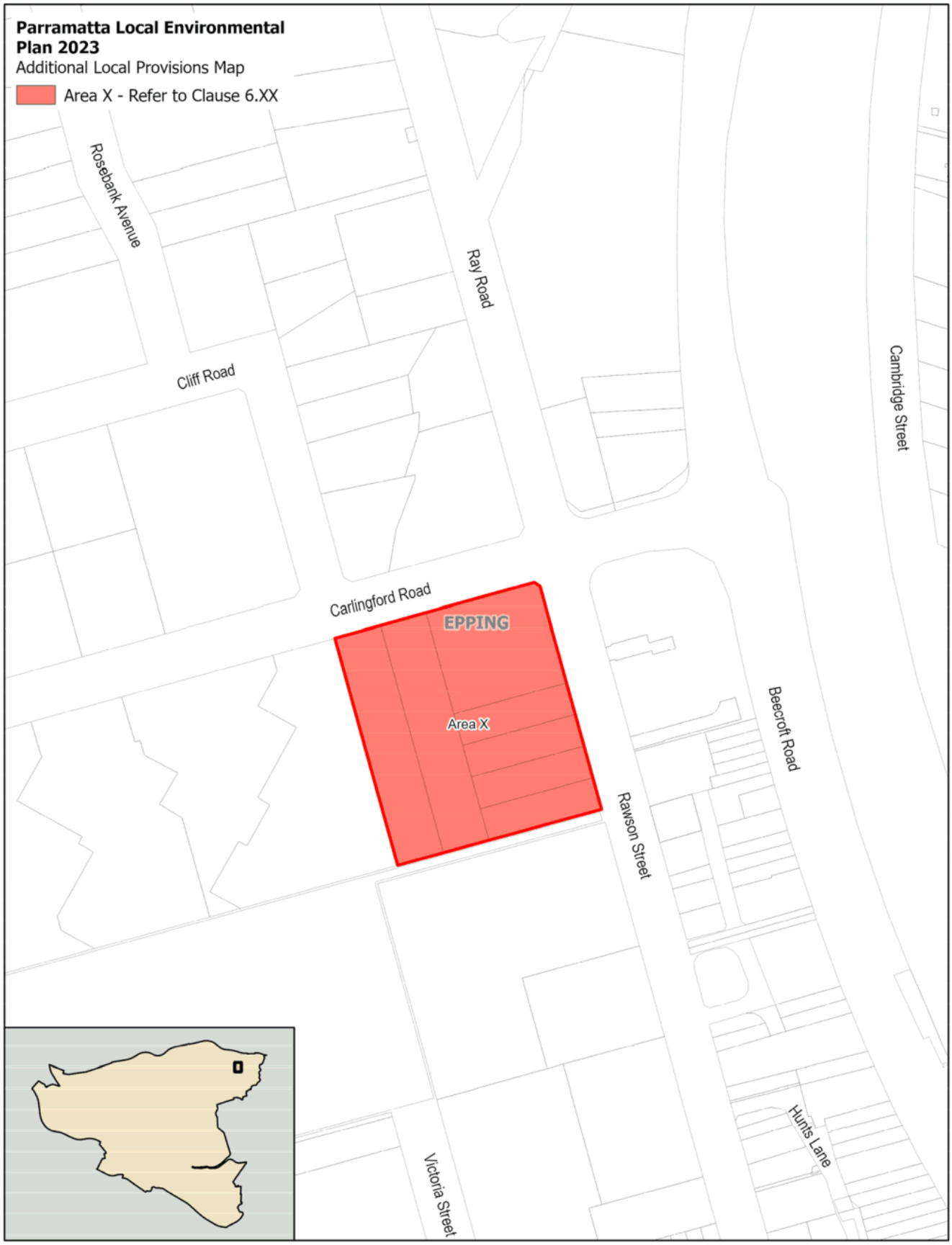
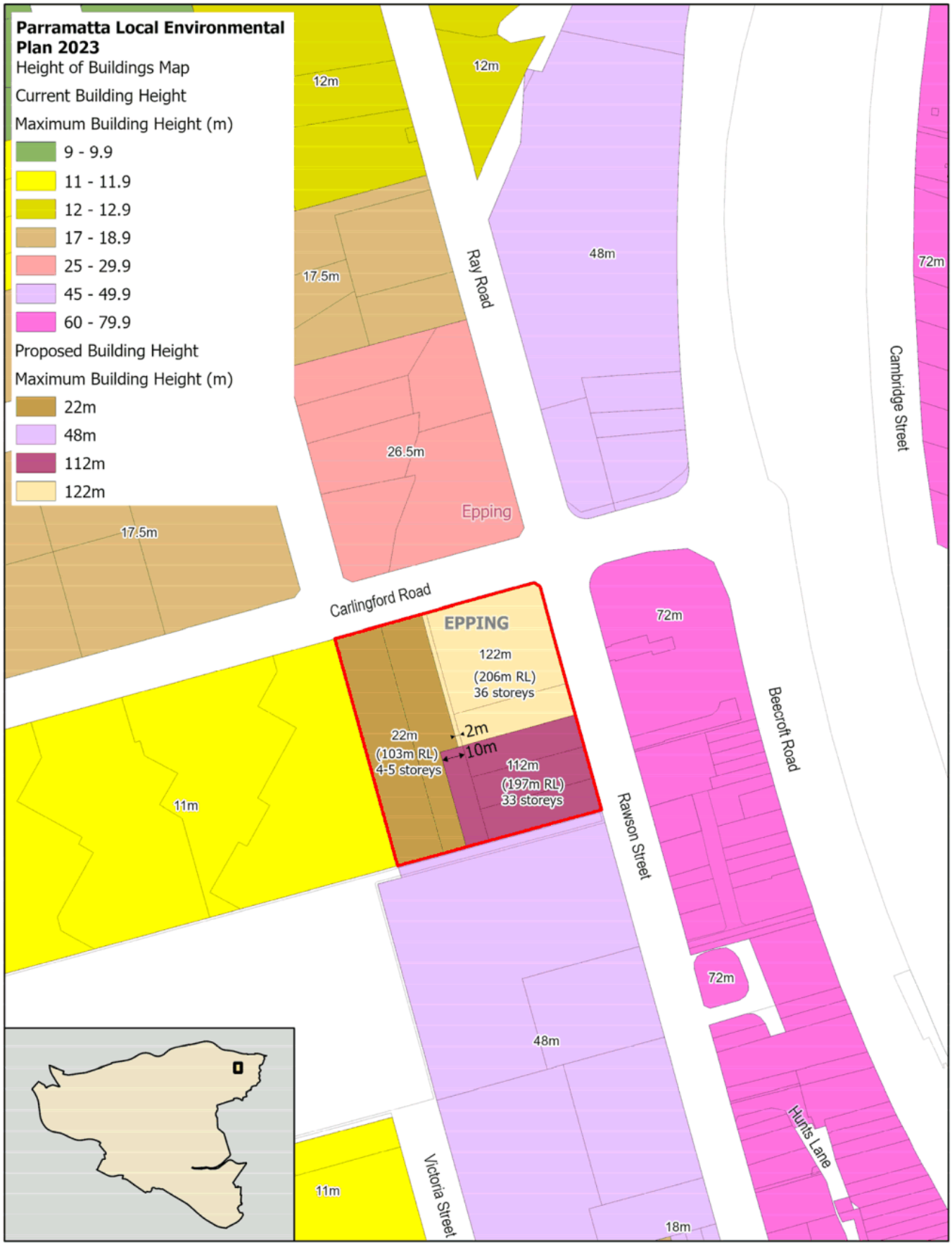
02 8073 4677


Parramatta Local Environmental Plan 2023
Additional Local Provisions Map
Area X - Refer to Clause 6.XX
Rosebank Avenue
Ray Road
Cliff Road
Cambridge Street
Carlingford Road
EPPING
Area X
Beecroft Road
Rawson Street
Victoria Street
Hunts Lane
N
0
20
40 m
Parramatta Local Environmental Plan 2023
Amendment No 3
PP-2021-6314
Data Prepared by: David Hewetson
Date: 22/05/2023
Approved:



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0 20 40m

Parramatta Local Environmental Plan 2023
53-61 Rawson Street, Epping

Data Prepared by: **David Hewetson**
Date: **13/05/2024**

Approved:

8.1.1.5 EPPING AREAS – MIXED-USE DEVELOPMENT

In addition to the general provisions set out in Section 8.1.1.1 EPPING CENTRAL, the following specific provisions apply to specific land zoned E1 Local Centre as identified in this Section. This Section should be read in conjunction with Part 4 – Non-Residential Development and Part 3 – Residential Development of this DCP. To the extent of any inconsistencies, the specific provisions within this Section shall prevail.

8.1.1.5.1 53 - 61 RAWSON STREET, EPPING PRECINCT

This Section applies to the site bounded by Rawson Street, Carlingford Road and adjoining sites in Epping. The subject site is illustrated in Figure 8.1.1.5.1.

The site comprises 3 individual land parcels as follows: 53 Rawson Street, Epping (Lots 4-7 in DP 19329 and Lots 8-9 in DP 975578) and 61 Rawson Street (Lot 1 in DP 71071)

Figure 8.1.1.5.1 - Land application map

This DCP establishes principles, objectives and controls to be interpreted during preparation and assessment of development applications and supports the objectives of the LEP.

In addition to general objectives listed in Part 8 of this DCP, specific objectives of this site are identified below and within each section of this site-specific DCP.

O.01 Reinforce the role of the site as a key retail and commercial destination.

O.02 Provide a mix of residential and commercial uses to support high levels of activation within the site and to the surrounding streetscape.

Public Domain and Publicly Accessible Open Space

Objectives

O.03 Provide well-considered publicly accessible open space areas that support wayfinding, legibility and through-site connections for residents and visitors.

O.04 Appropriately manage vehicular and pedestrian access between Carlingford Road, Rawson Street and Boronia Park.

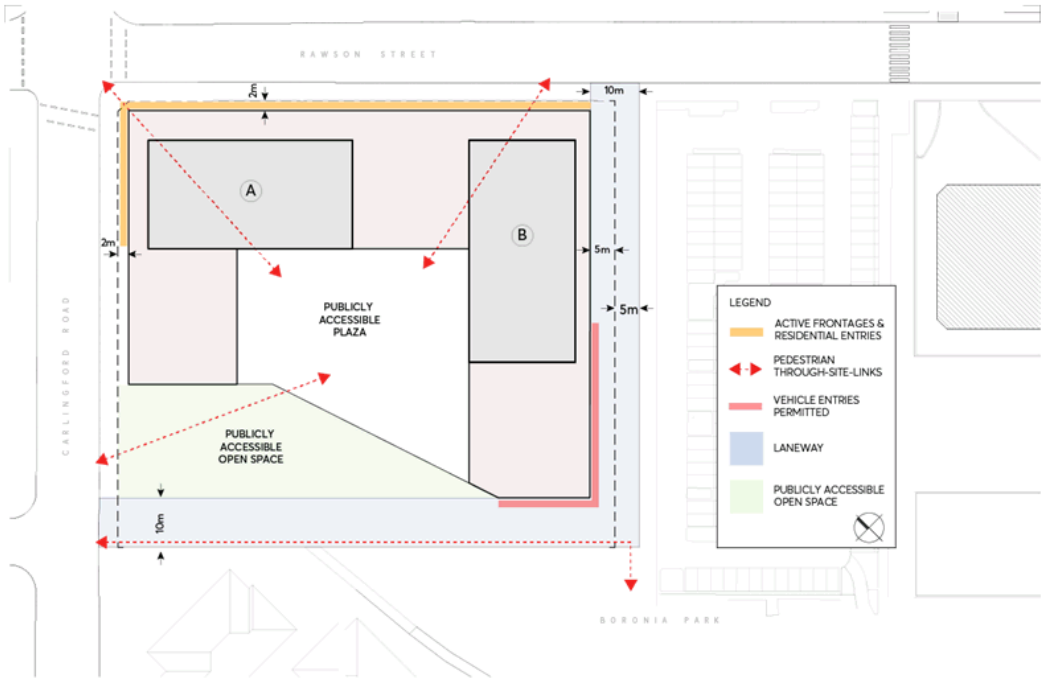


Figure 8.1.1.5.2 – Indicative ground floor layout

Controls

C.1 Public domain and publicly accessible open space shall be generally in accordance with Figure 8.1.1.5.2 noting that alternative options will be considered. This includes the central plaza, a widened footpath along Rawson Street, a 10m wide laneway, and the publicly accessible open space area in the north-west portion of the site.

C.2 The designs of the public domain and publicly accessible open spaces are to:

a) Incorporate a palette of high-quality design treatments and finishes to facilitate active and passive recreation consistent with Council public domain guidelines.

b) Incorporate an awning to street frontages.

c) Be accessible 24 hours a day seven days a week.

d) Include clear, accessible and safe links between Rawson Street, Carlingford Road and Boronia Park.

e) Provide visual links from within the site to Rawson Street and Carlingford Road.

f) Incorporate principles of Crime Prevention through Environmental Design to support safety and security of users.

g) Deliver a consistent footpath width and treatment along Rawson Street and Carlingford Road.

h) Be designed to allow universal access.

C.3 The design of the central plaza is to:

a) Include a combination of hard surfaces and landscaping.

b) Provide outdoor spaces and seating areas that are protected from the elements (i.e., sun, wind, rain impacts) to allow for use all-year round.

c) Provide activated frontages and outdoor dining opportunities.

C.4 The design of the publicly accessible open space area in the north-western corner of the site is to:

a) Prioritise pedestrians over vehicles and ensure the safety of pedestrians.

b) Support urban tree canopy cover.

c) Provide deep soil zones on site.

d) Include Stormwater management treatments and a combination of indigenous, native and exotic vegetation.

e) Improve pedestrian connections from Carlingford Road to Boronia Park.

f) Provide passive recreation opportunities.

g) Clearly delineate public and private uses.

C.5 The design of the laneway shall be generally as per the details and cross sections in Figure 8.1.1.5.3 noting that alternative options will be considered, and shall comprise:

a) Total width of 10m, with:

i. Two 3.5m vehicular lanes in each direction,

ii. 2.4m wide footpath along the southern and western boundary to connect to Boronia Park,

iii. Trees in grates on the footpath,

iv. Kerb and gutter arrangement for the laneway.

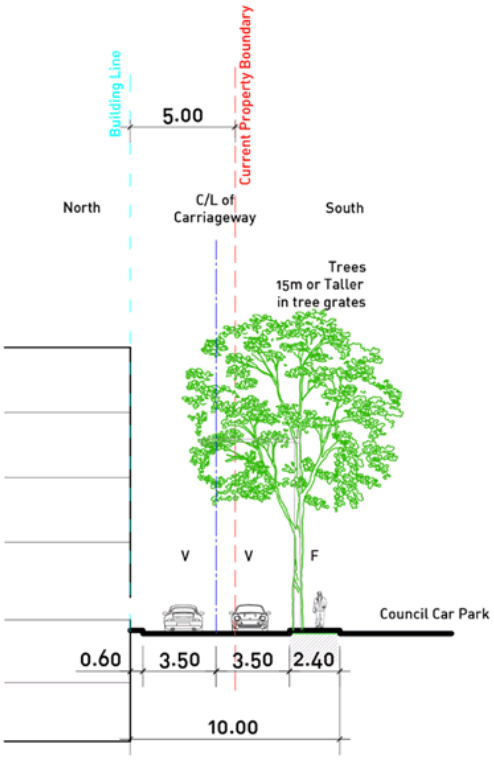
b) Prioritise the safety of pedestrians in the area using appropriate materials.

c) Align with materials in the Parramatta Public Domain Guidelines.

d) Provide adequate flooding mitigation measures including but not limited to:

- a raised entrance crest to the basement level;
- flood gates;
- the first level with pedestrian access being located above the 1% AEP + freeboard and the PMF flood level (achieved in reference scheme);
- residential floors being above the PMF flood level (achieved in reference scheme); and
- a shelter-in-place strategy could be implemented if required.

e) The laneway shall be delivered generally in accordance with Figure 8.1.1.5.2 and Figure 8.1.1.5.3 and is to be dedicated to Council.

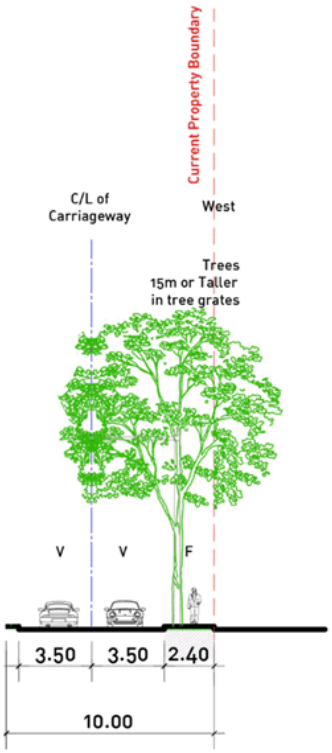


LANEWAY - SOUTHERN SIDE / TYPICAL

LEGEND:

F - FOOTPATH
V - VEHICULAR LANE

Note:
a. Light Poles are indicative and for locations only. Light pole design and type to be confirmed.



LANEWAY - WESTERN SIDE
along publicly accessible open space

Figure 8.1.1.5.3 – Laneway cross sections

Podium and street wall

Objectives

O.05 Ensure buildings are sited to consider site constraints, topography, and surrounding uses.

O.06 Provide an activated ground floor retail interface with fine grain uses to enhance the character and function of Rawson Street as a high street, and turn the corner to Carlingford Road.

O.07 Provide a street wall at an appropriate height to spatially define Carlingford Road and Rawson Street that is well proportioned, humanly scaled and finely grained, with facades of tactile material quality.

O.08 Create visual interest and variety in the streetscape within an overall framework of consistency in the definition of the street and its character.

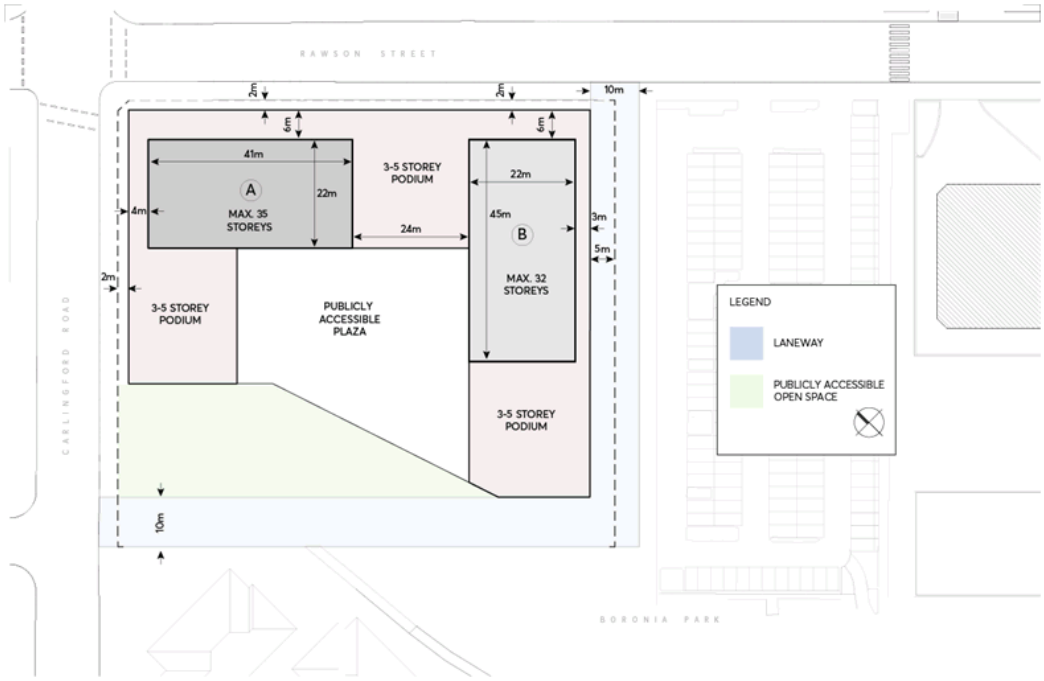


Figure 8.1.1.5.4 – Indicative site layout and built form

Controls

C.6 The site layout and building envelope is to be generally consistent with Figure 8.1.1.5.4.

C.7 Podiums should have a predominant street wall height of either 3 or 4 storeys along both Rawson Street and Carlingford Road, with a maximum of 5 storeys in line with the natural topography.

C.8 Podiums should have a predominant street wall height of either 3 or 4 storeys along both Rawson Street.

C.9 Podiums can comprise part 5 storeys on the western edge of the podiums due to the slope of the land in response to the natural topography.

C.10 The height of the podium parapet is to be consistent across the development to provide clear definition of the podium, streets and laneways.

C.11 Minimum floor to floor heights are to be provided as follows:

a) Lower ground floor retail – 5.5m.

b) Ground floor retail – 5m.

c) Podium commercial -4m.

d) Residential – 3.15m.

C.12 Minimum setbacks are to be in accordance with Table 8.1.1.5.1 below and consistent with Figure 8.1.1.5.3:

Setback	Minimum Building Setback
Basement and lower ground (below finished ground level)	
Rawson Street	2m
Carlingford Road	2m
Southern Boundary	5m
Western Boundary	10m
Podium (from boundary)	
Rawson Street	2m
Carlingford Road	2m
Southern Boundary	5m
Western boundary	10m
Tower (from podium edge)	
Rawson Street	6m
Carlingford Road	4m
Southern podium edge	3m
Western podium edge	4m

Table 8.1.1.5.1 – Minimum podium and tower setbacks

C.13 Podium setbacks should be built to align with the setbacks for their entire height and free of architectural treatments (including balconies, fins and the like.) to ensure a clear street wall.

C.14 Residential access is to be provided with a legible, direct street address from either Rawson Street or Carlingford Road. A primary residential address must not be provided from the laneway or plaza.

C.15 An active frontage should be provided at ground level along Rawson Street and part of Carlingford Road. These frontages should have individual commercial and residential entries which meet the street at existing ground level to minimise the need for vertical circulation.

C.16 Active uses must fully occupy the ground floor frontage not taken up by services or vehicular access.

C.17 Street wall facades should:

a. Be consistent in materiality and rich in detail.

b. Be of predominantly masonry character with no lightweight panel construction or curtain walling.

c. Be articulated with depth, relief, and shadow on the street facade. A minimum relief of 150mm between the masonry finish and glazing face must be achieved.

d. Utilise legible architectural elements and spatial types - doors, windows, pilasters, sills, plinths, frame and infill, etc. - not necessarily expressed in a literal traditional manner.

e. Awnings are thoughtfully integrated into the design.

C.18 Building services should be concealed and screened from the public domain.

C.19 The street wall, particularly as articulated at the corner of Rawson Street and Carlingford Road, must be of solid architectural expression to ground the built form and frame the street.

C.20 Lower ground and basement levels must adhere to the podium setbacks in *Table 8.1.1.5.1*, and be located within the building footprint.

Towers

Objectives

O.09 Towers are set back above street walls as clearly distinct free-standing buildings to mitigate wind and urban heat impacts, enable views to the sky and protect amenity in streets and public places.

O.10 Orient towers to optimise solar access, natural ventilation and privacy while minimising overshadowing to Boronia Park and adjoining land.

O.11 Provide adequate separation between slender towers to allow for greater outlook from towers, and increased views to sky and solar access at ground level.

O.12 Establish an appropriate transition in height to surrounding development and Boronia Park through building configuration, setbacks and architectural treatments.

Controls

C.21 Built Form is to be in accordance with the following height in storeys in Table 8.1.1.5.2.

53-61 Rawson Street	**Maximum building height under the LEP (including 3m Plant)**	**Maximum number of storeys**
Built form	RL 103m (22m)	5
	RL 197 (112m)	33
	RL 206 (122m)	36

Table 8.1.1.5.2 – Maximum building heights

C.22 A maximum of two towers is permitted on the site.

C.23 The maximum number of storeys shown in Table 8.1.1.5.2 includes the lower ground floor as a part storey, which due to the slope of the land is partially recessed below natural ground level to the west. The maximum number of storeys shall exclude the roof plant level.

C.24 The maximum height of buildings mapped for the site in PLEP 2023 includes a 3m height allowance for plant and is not to be used for the purpose of an additional residential and/or commercial storey.

C.25 The towers are to be clearly defined as discrete built form elements above the podium, as expressed in massing and materiality.

C.26 Towers should not be oriented parallel to Carlingford Road to minimise the residential amenity impacts of traffic noise and pollution.

C.27 Where possible, towers should be set back from the central plaza to minimise wind and visual bulk impacts.

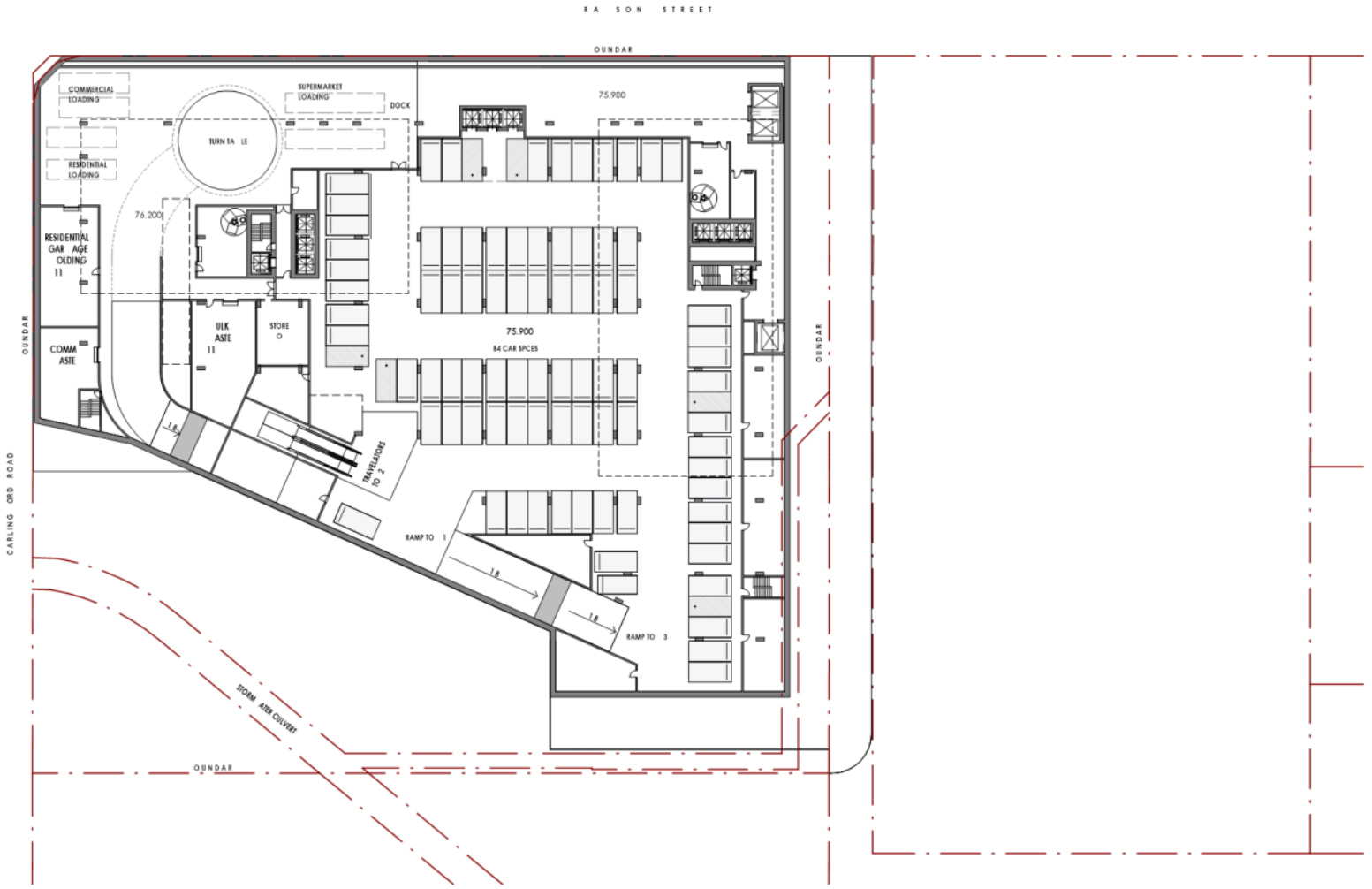
C.28 Undercrofts or other interruptions of the street wall which expose the underside of the tower and amplify its presence on the street or in publicly accessible open spaces are not permitted.

C.29 A maximum of one step in the built form between the street wall and tower shall be provided.

C.30 Floorplates are to be limited to a maximum dimension of 45m.

C.31 Building floorplates above the podium are not to exceed 750m^2 of gross floor area.

RAWSON STREET
BOUNDARY
CARLINGFORD ROAD
STORAGE AREAS
PLANT
131 SPACES (RESIDENTIAL / VISITOR)
RAMP TO B2
RAMP TO B4
STORMWATER CULVERT
TYPICAL BASEMENT G&A = APPROX. 6000 SQM
INDICATIVE CAR PARKING
MAXIMUM DCP CARPARKING RATES
RESIDENTIAL
REQUIRED
PROVIDED
1BED (130 APT x 0.4) 52 52
2BED (240 APT x 0.7) 209 209
3BED (60 APT x 1.2) 79 79
VISITOR (507 APT / 7) 73 73
TOTAL 413 413
RES BICYCLE (507 APT / 2) 254 254
COMMERCIAL *
REQUIRED
RETAIL (2408m² / 30) 80 (2408m² / 50) 48
COMMERCIAL (6575m² / 50) 131 (6575m² / 100) 67
SUPERMARKET (3100m² / 30) 103 103
MINI MAJOR (600m² / 30) 20 20
TOTAL 334 238
* EXCLUDES BOH, MALL, LOBBY AREAS
MOTORCYCLE (131 / 25) 6 6
COMM BICYCLE (6576m² / 200) 33 33
MAXIMUM DCP CARPARKING RATES - (PART 4.1)
RESIDENTIAL
1 BED - 0.4 SPACES
2 BED - 0.7 SPACES
3 BED - 1.2 SPACES
VISITOR - 1 SPACE PER 7 APTS
MINIMUM 1 CAR SHARE SPACE
RESIDENTIAL BICYCLE PARKING - 1 SPACE PER 2 APTS (PART 3.6)
COMMERCIAL
COMMERCIAL - 1 SPACE PER 60SQM
RETAIL - 1 SPACE PER 30SQM
ACCESSIBLE - MIN 1% OF ALL COMMERCIAL SPACES
MOTORCYCLE - 1 SPACE PER 25 CAR SPACES
COMMERCIAL BICYCLE PARKING - 1 SPACE PER 200SQM
TO BE UPDATED
1: 500
0 2.5 5 12.5 25m
KANNFINCH
oakstand
EPPING TOWN CENTRE
Rawson Street cnr Carlingford Road EPPING NSW
BASEMENT 3 PLAN
(BASEMENT 4 & 6 SIMILAR)
DA.101
E
17.06.21



KANNFINCH oakstand

EPPING TO N CENTRE
R S r r C r r d R d EPPING NS

ASEMENT 2 PLAN

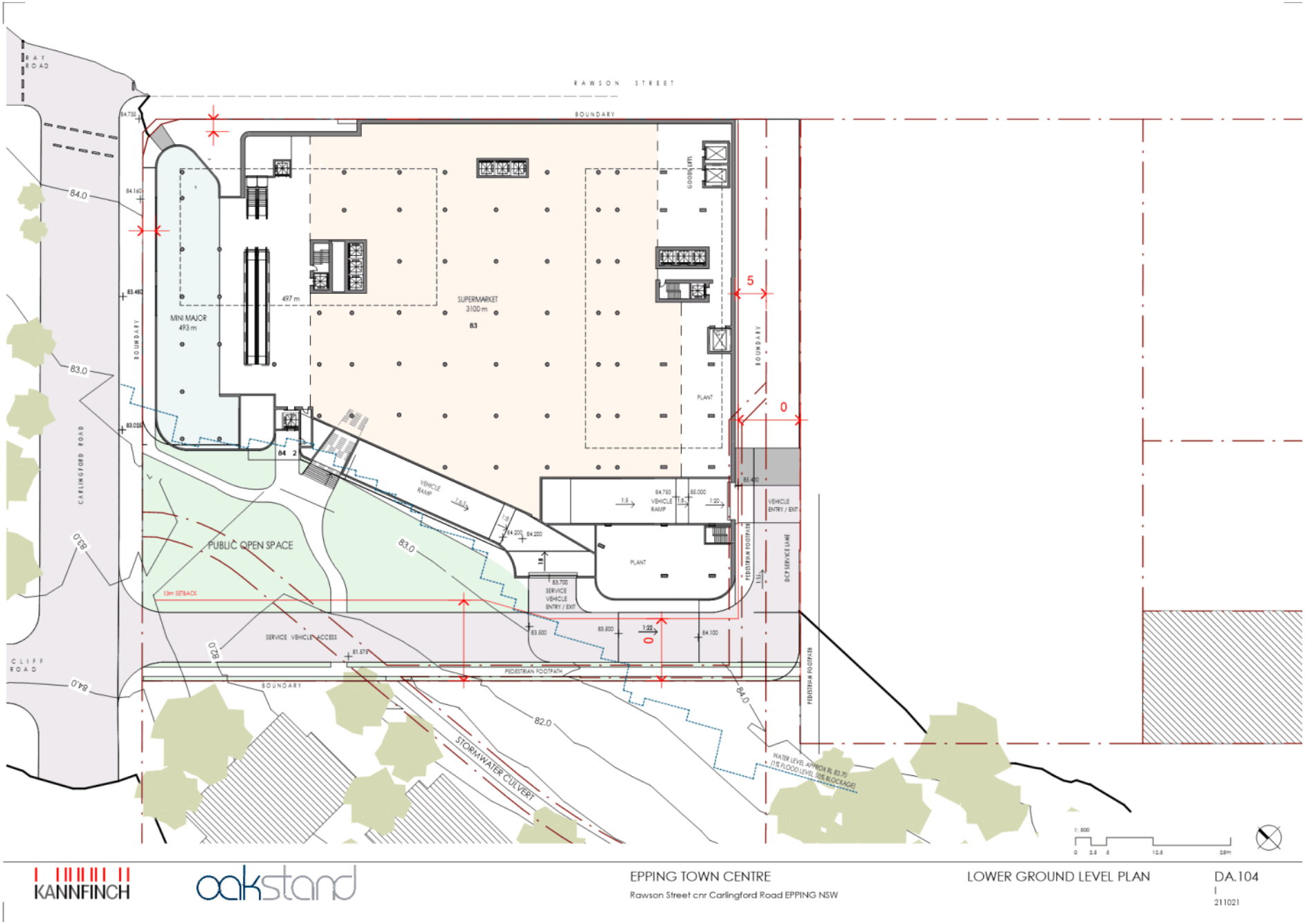
DA 1 2
I
211 21

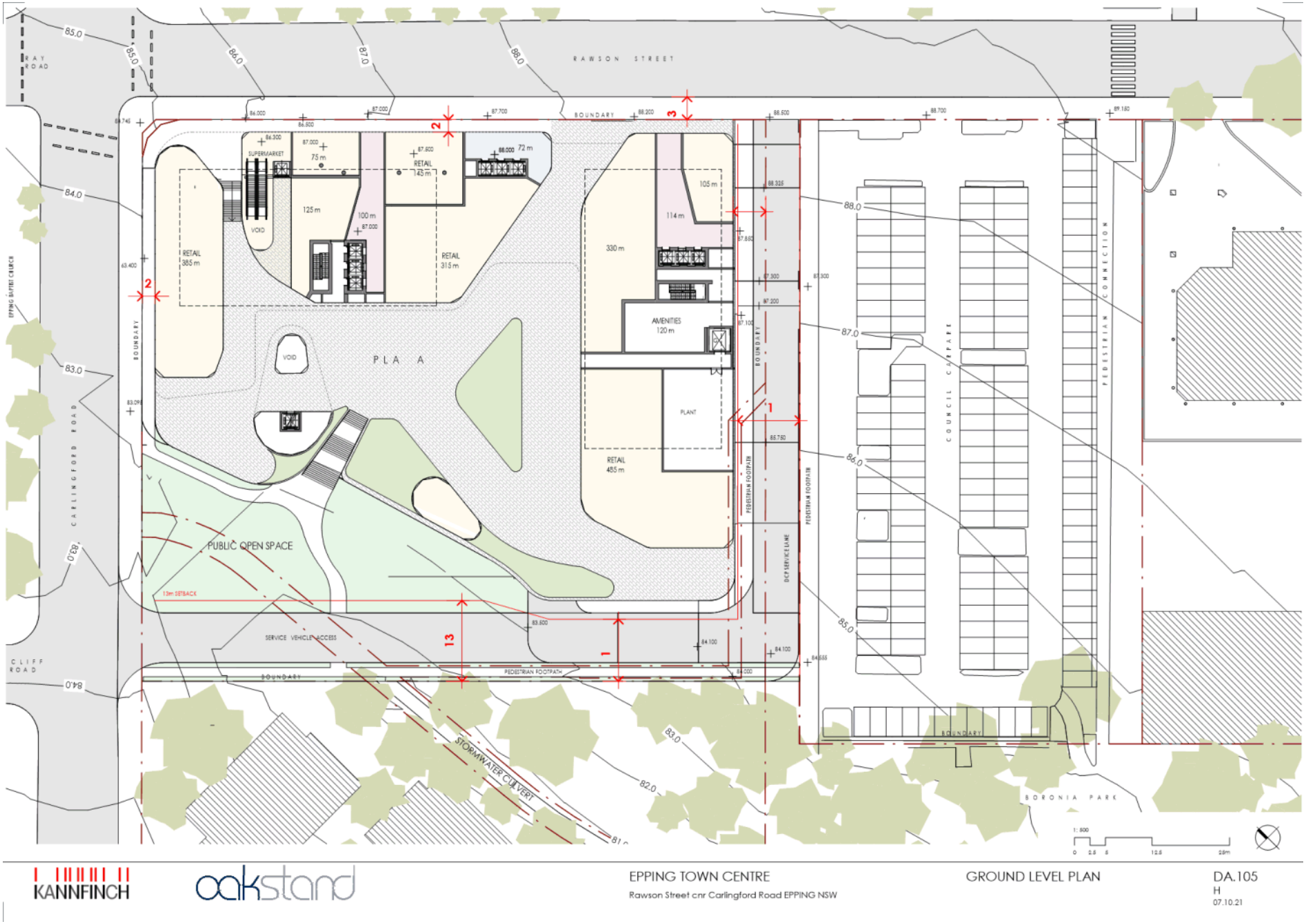
KANNFINCH oakstand

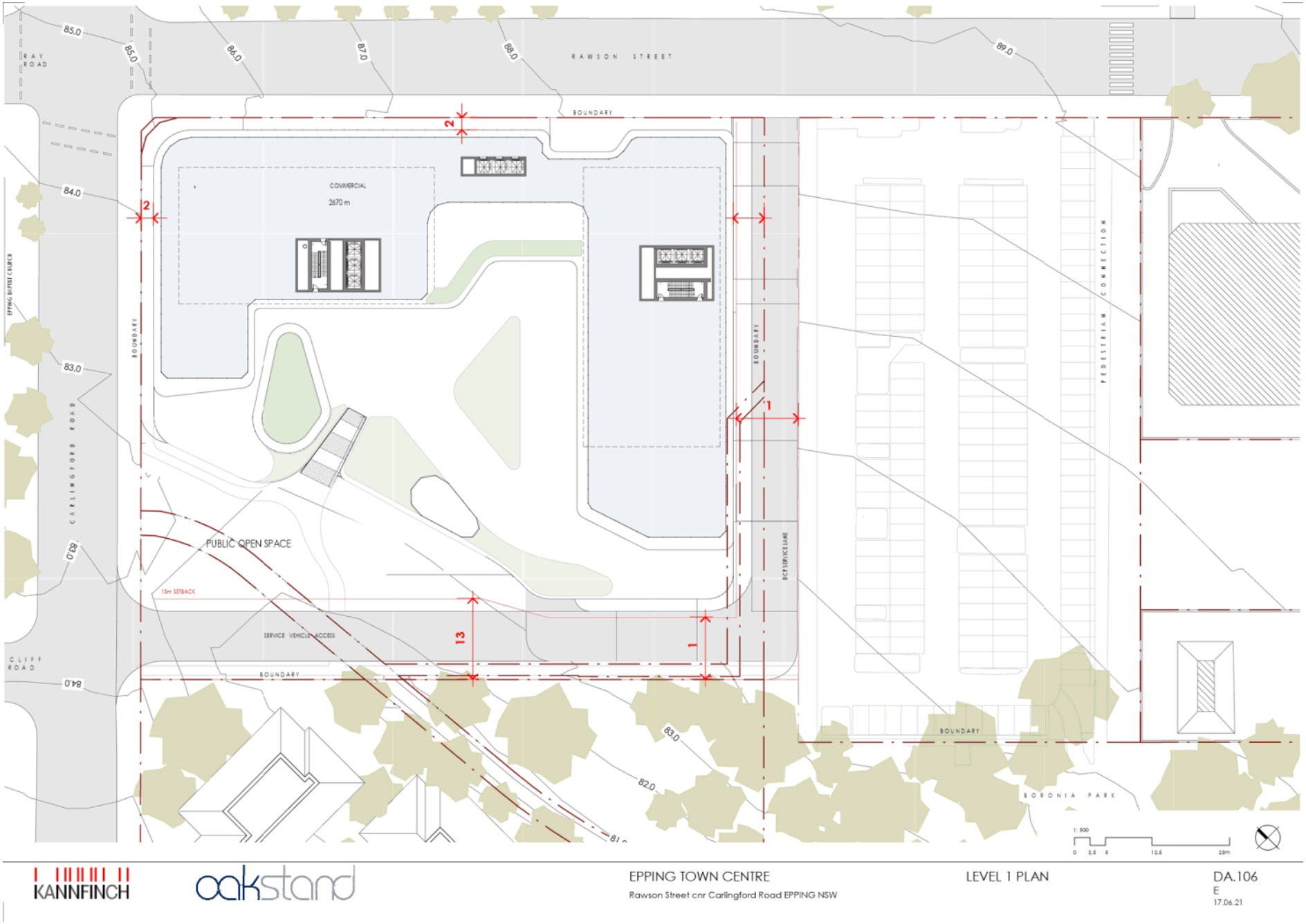
EPPING TO N CENTRE
R S r r C r r d R d EPPING NS

ASEMENT 1 PLAN

DA 1 3
I
211 21


RAWSON STREET
BOUNDARY
CARLINGFORD ROAD
CLIFF ROAD
MINI MAJOR
493 m
497 m
SUPERMARKET
3100 m
83
PLANT
VEHICLE RAMP
VEHICLE ENTRY / EXIT
PUBLIC OPEN SPACE
13m SETBACK
SERVICE VEHICLE ACCESS
PEDESTRIAN FOOTPATH
STORMWATER CULVERT
WATER LEVEL APPROX RL 83.70
(1% FLOOD LEVEL 50% BLOCKAGE)
84.0
83.0
82.0
5
0
KANNFINCH
oakstand
EPPING TOWN CENTRE
Rawson Street cnr Carlingford Road EPPING NSW
LOWER GROUND LEVEL PLAN
DA.104
I
211021


RAWSON STREET
RAY ROAD
CARLINGFORD ROAD
CLIFF ROAD
BORONIA PARK
PEDESTRIAN CONNECTION
COUNCIL CARPARK
PEDESTRIAN FOOTPATH
DCP SERVICE LANE
SERVICE VEHICLE ACCESS
PUBLIC OPEN SPACE
13m SETBACK
STORMWATER CULVERT
PLA A
VOID
SUPERMARKET
RETAIL 385 m
RETAIL 315 m
RETAIL 145 m
RETAIL 485 m
AMENITIES 120 m
PLANT
125 m
100 m
75 m
72 m
105 m
114 m
330 m
KANNFINCH
oakstand
EPPING TOWN CENTRE
Rawson Street cnr Carlingford Road EPPING NSW
GROUND LEVEL PLAN
DA.105
H
07.10.21

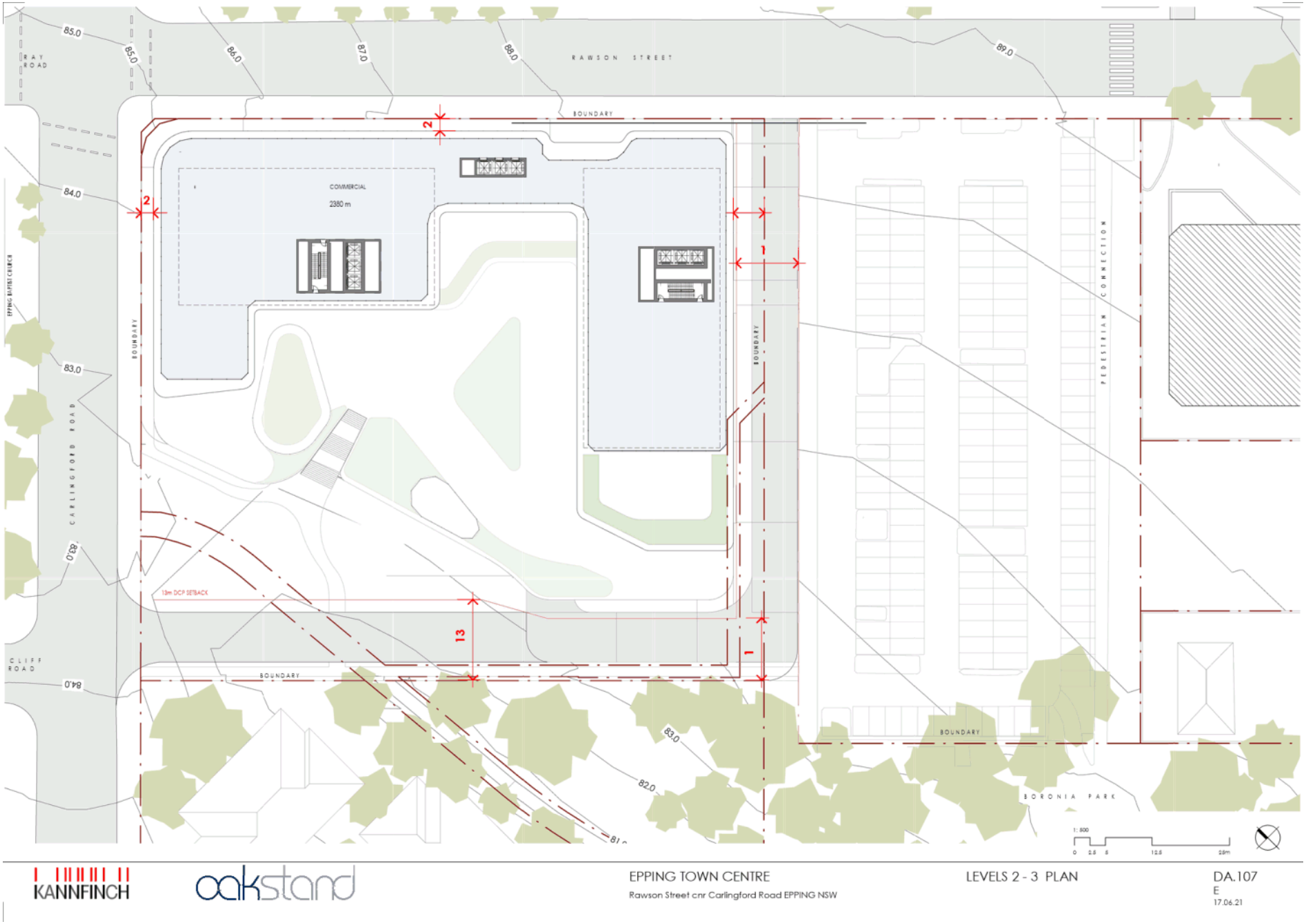


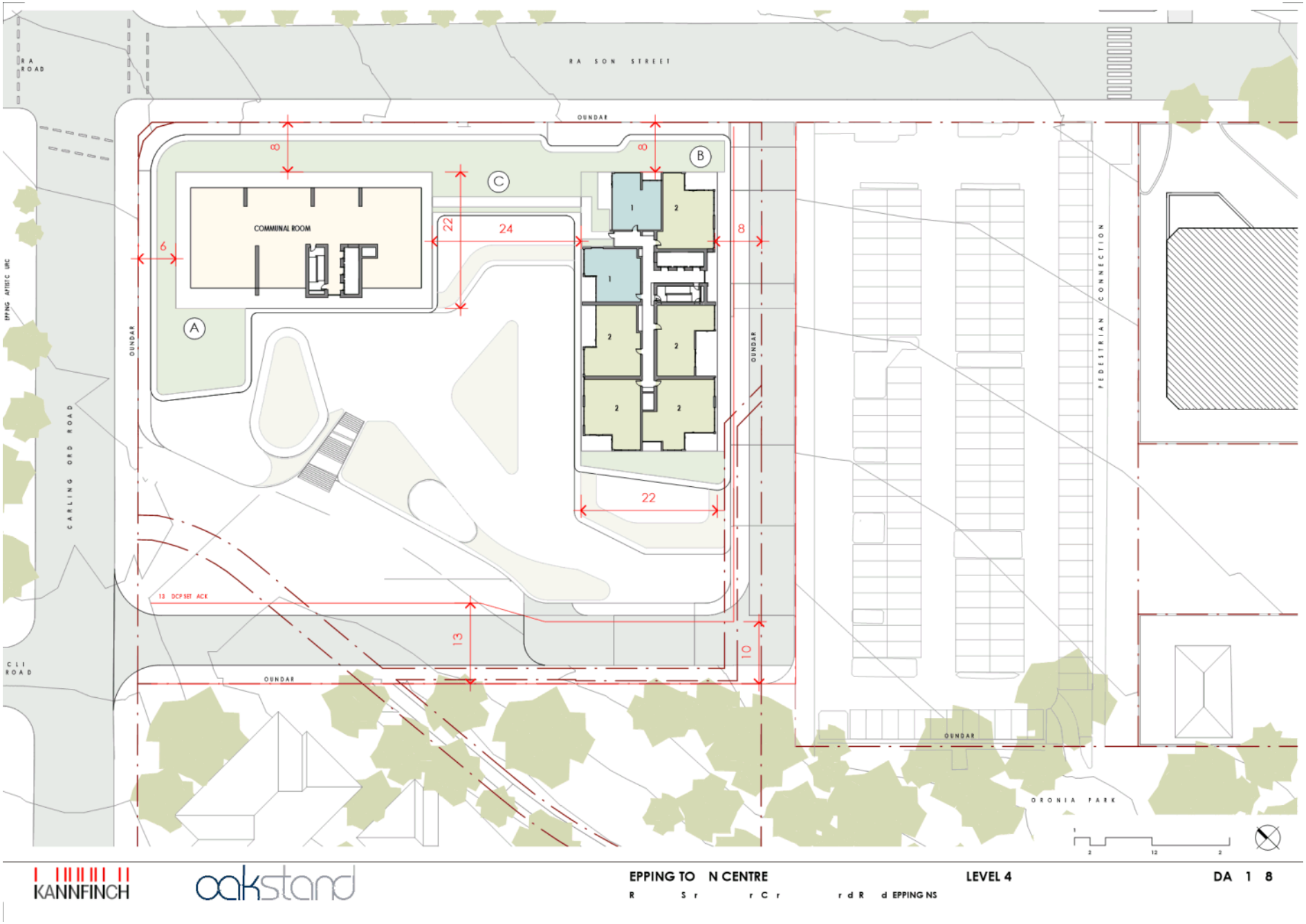
KANNFINCH oakstand

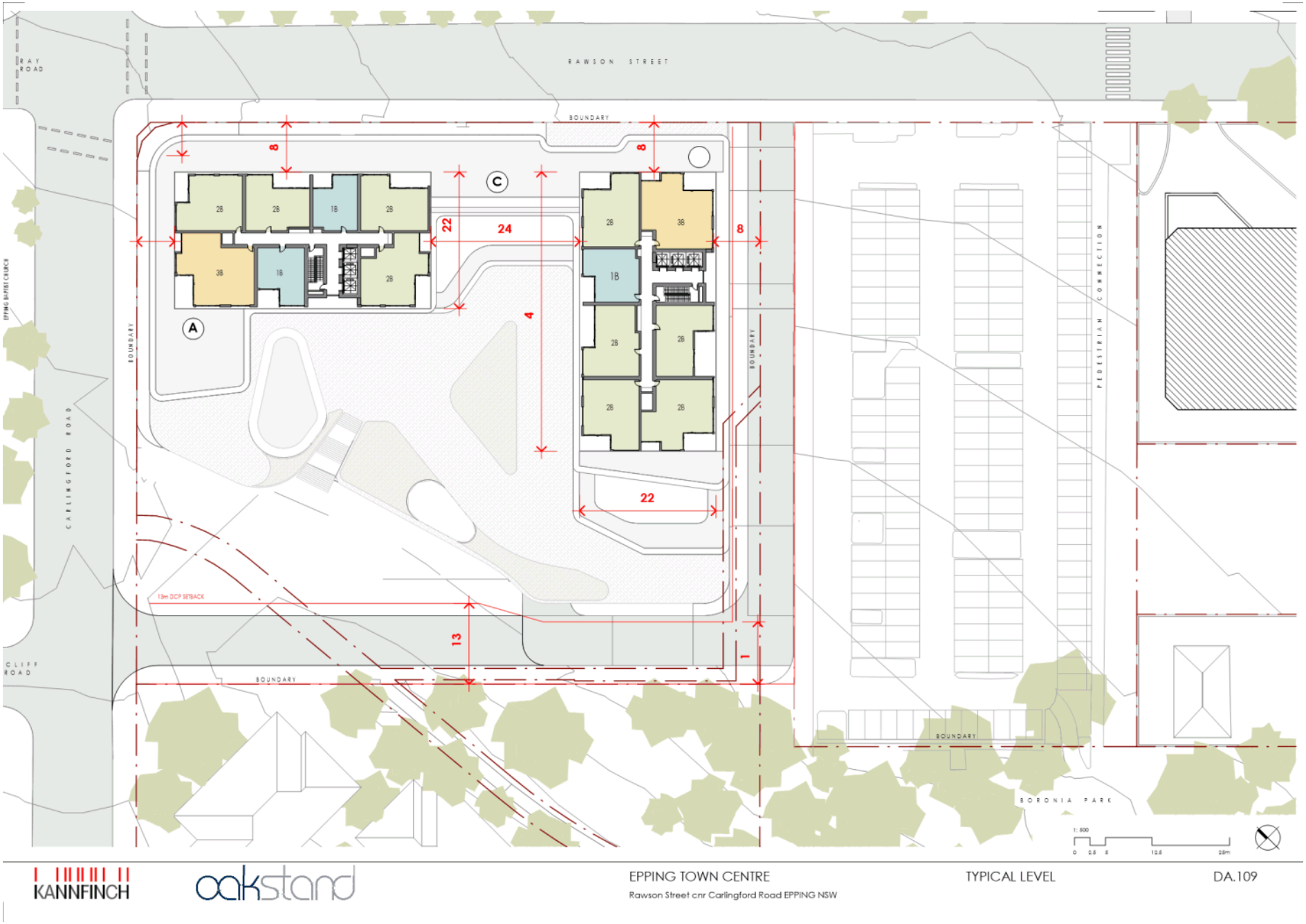
EPPING TOWN CENTRE
Rawson Street cnr Carlingford Road EPPING NSW

LEVEL 1 PLAN

DA.106
E
17.06.21


RAWSON STREET
BOUNDARY
COMMERCIAL
2380 m
CARLINGFORD ROAD
PEDESTRIAN CONNECTION
18m DCP SETBACK
BORONIA PARK
CLIFF ROAD
KANNFINCH
oakstand
EPPING TOWN CENTRE
Rawson Street cnr Carlingford Road EPPING NSW
LEVELS 2 - 3 PLAN
DA.107
E
17.06.21


RA SON STREET
RA ROAD
OUNDAR
COMMUNAL ROOM
A
B
C
8
8
6
22
24
8
22
13
10
13 DCP SET ACK
CARLING ORD ROAD
PEDESTRIAN CONNECTION
ORONIA PARK
KANNFINCH
oakstand
EPPING TO N CENTRE
LEVEL 4
DA 1 8

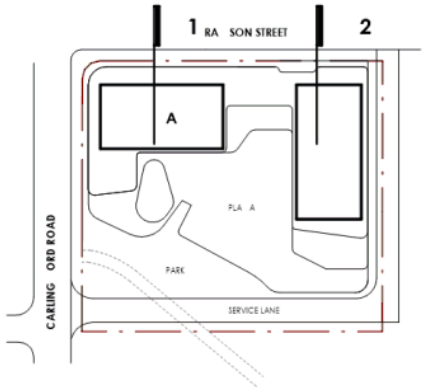


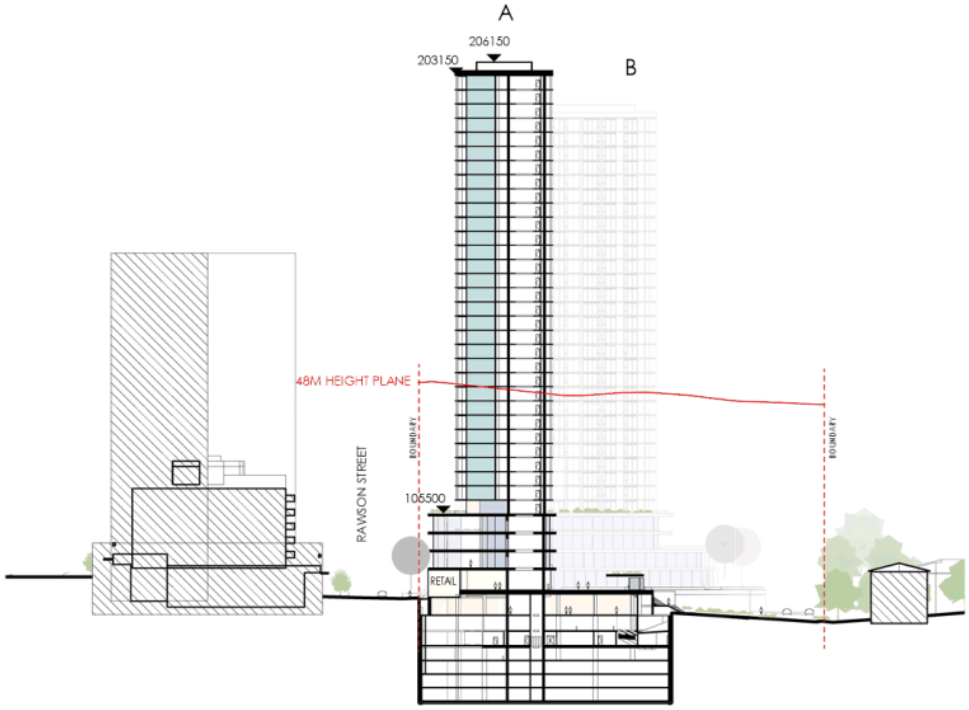
KANNFINCH oakstand

EPPING TOWN CENTRE
Rawson Street cnr Carlingford Road EPPING NSW

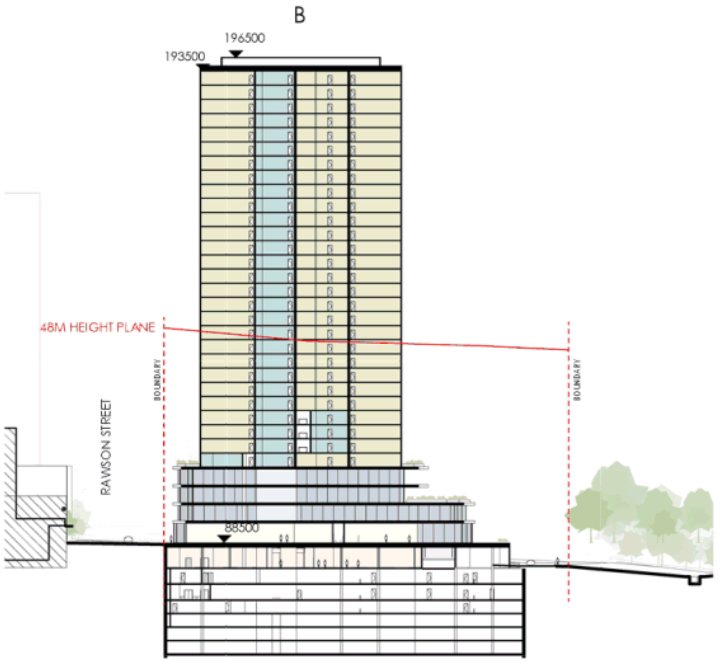
TYPICAL LEVEL

DA.109





SECTION - NORTH SOUTH - 01



SECTION - NORTH SOUTH - 02

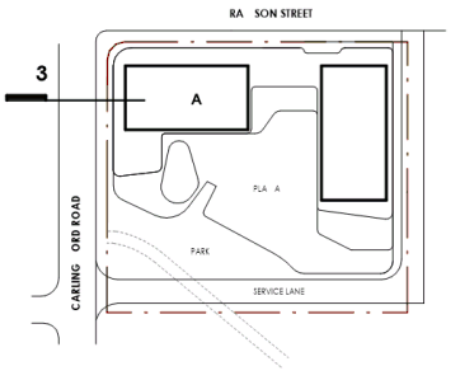
1: 1000
0 5 10 25 50m

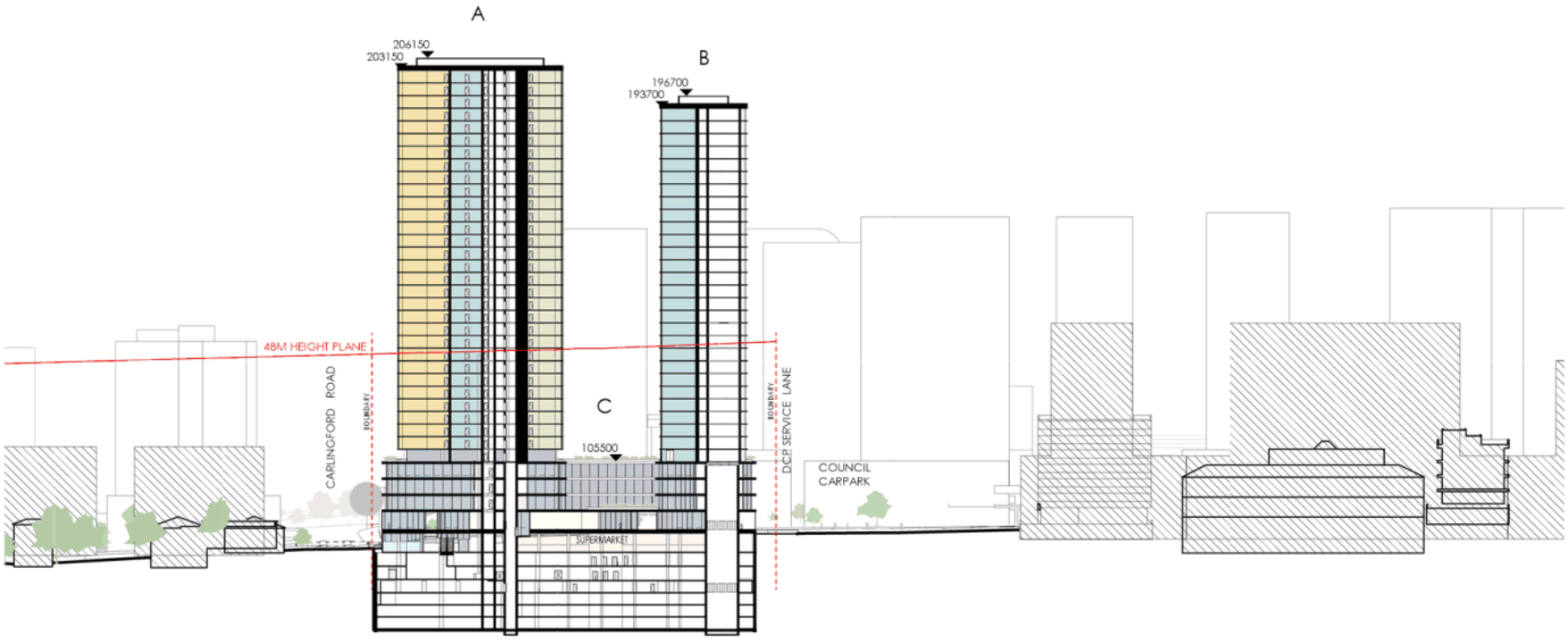
KANNFINCH oakstand

EPPING TOWN CENTRE
Rawson Street cnr Carlingford Road EPPING NSW

SECTIONS

DA.200
H
07.10.21





SECTION - EAST WEST - 03

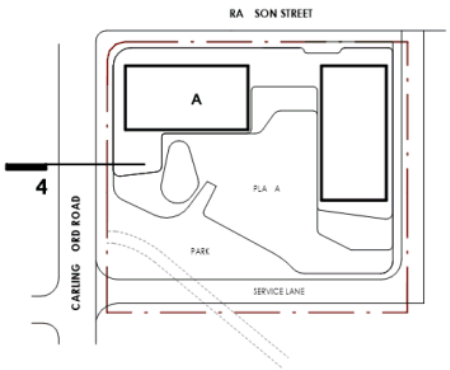
1: 1000
0 5 10 25 50m

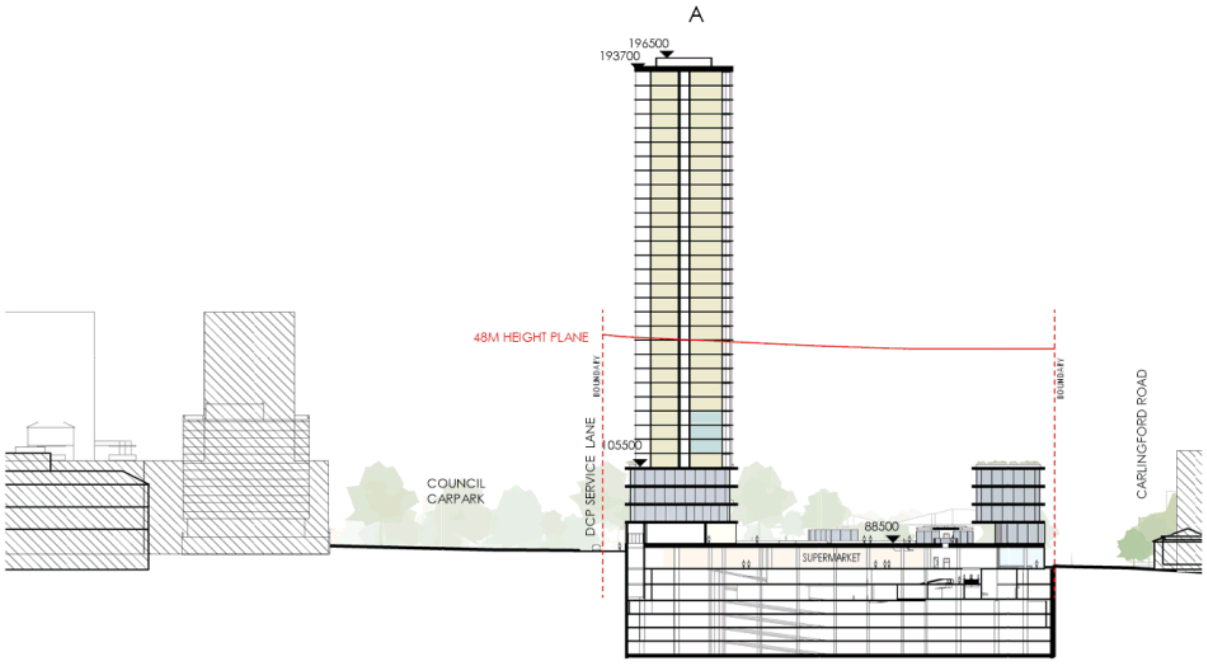
KANNFINCH oakstand

EPPING TOWN CENTRE
Rawson Street cnr Carlingford Road EPPING NSW

SECTIONS

DA.201
H
07.10.21





SECTION - NORTH SOUTH - 04

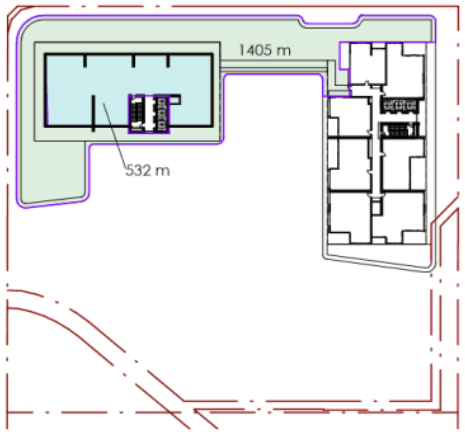
1: 800
0 2.5 5 12.5 25m

KANNFINCH oakstand

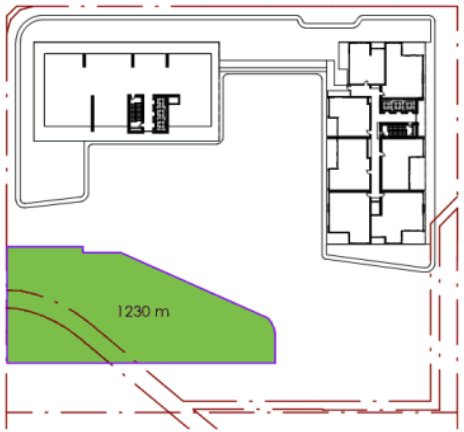
EPPING TOWN CENTRE
Rawson Street cnr Carlingford Road EPPING NSW

SECTIONS

DA.202
E
17.06.21



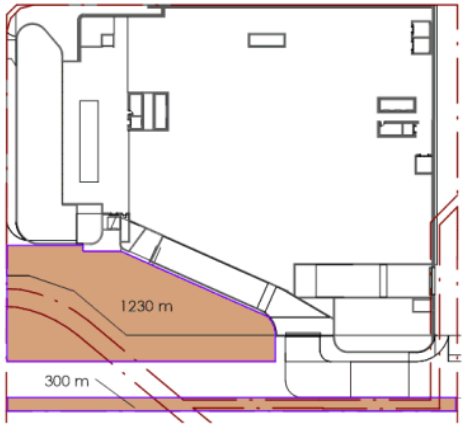
LEVEL 4 - COMMUNAL OPEN SPACE



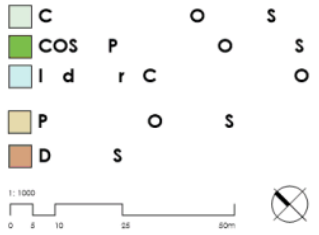
GROUND - PUBLIC OPEN SPACE

SITE AREA 9089m		
	REQUIRED - ADG	PROVIDED
COMMUNAL OPEN SPACE COS / PUBLIC OPEN SPACE COMMUNAL ROOM	25%	15.5% - 1405m 13.5% - 1230m 6% - 532m
PUBLIC OPEN SPACE	N/A	50% - 4600m
DEEP SOIL (MIN 6m WIDE)	7%	13.5% - 1230m

GROUND - POS



BASEMENT LEVEL 1 - DEEP SOIL



KANNFINCH oakstand

EPPING TOWN CENTRE
Rawson Street cnr Carlingford Road EPPING NSW

OPEN SPACE DIAGRAMS

DA.500
E
17.06.21

TYPICAL LEVEL - SOLAR ACCESS

9.00 .00

290 APARTMENTS (290/406) - **1** - RECEIVE MIN 2HRS SOLAR ACCESS TO HABITABLE AREAS BETWEEN THE HOURS OF 9.00AM AND 3.00PM

*APPROX 28 APARTMENTS (18/507) - - RECEIVE NO SOLAR ACCESS TO THE APARTMENT BETWEEN 9.00AM AND 3.00PM

TYPICAL LEVEL - VENTILATION

r

35 APARTMENTS (35/49) - **1** - ARE NATURALLY CROSS VENTILATED 9 STOREYS ABOVE GROUND.

UNDER THE ADG APARTMENTS ABOVE THIS HEIGHT ARE CONSIDERED NATURALLY VENTILATED

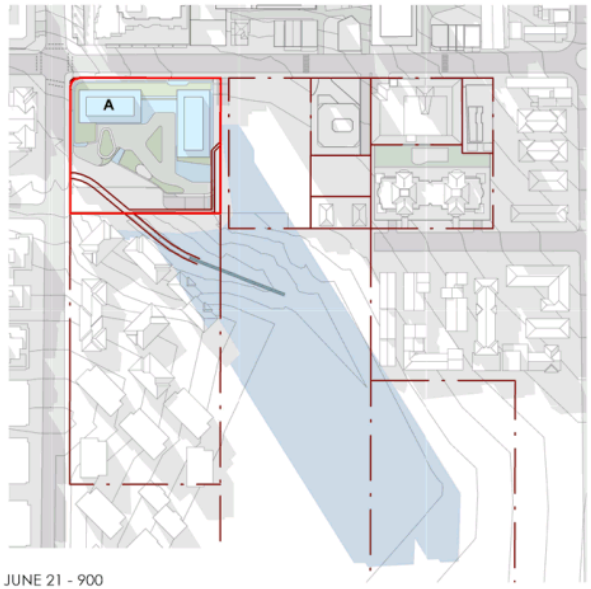
1: 1000
0 5 10 25 50m

KANNFINCH oakstand

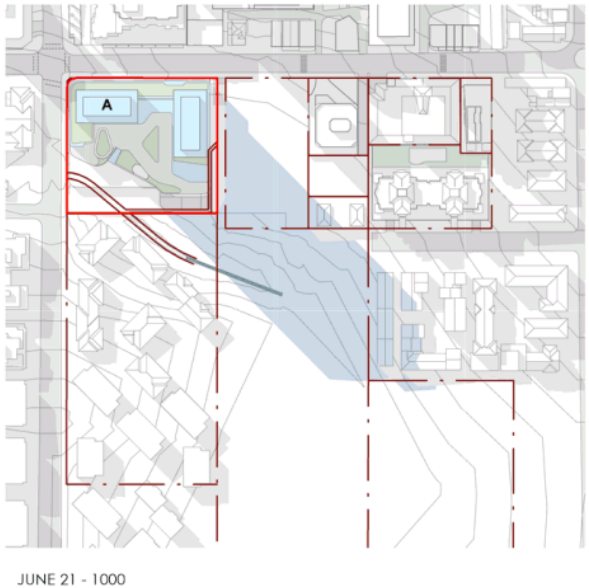
EPPING TOWN CENTRE
Rawson Street cnr Carlingford Road EPPING NSW

SOLAR ACCESS & NATURAL VENTILATION DIAGRAMS

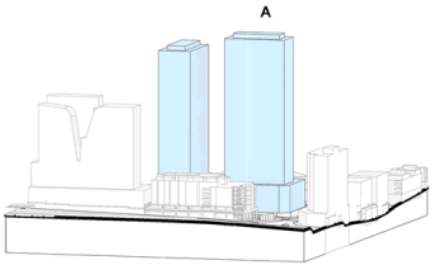
DA.520
E
17.06.21

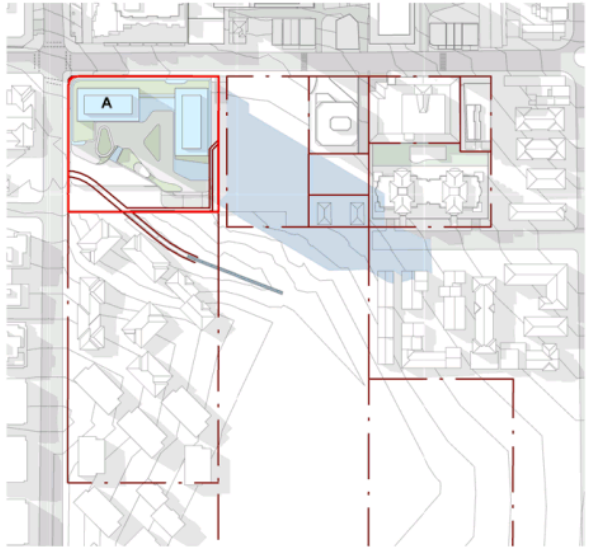


JUNE 21 - 900

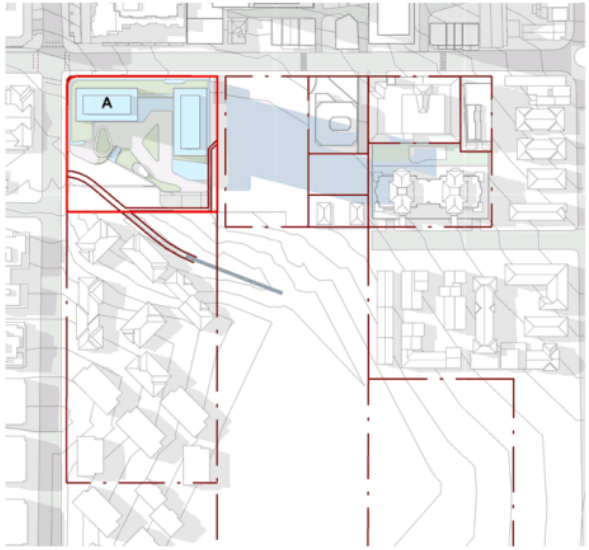


JUNE 21 - 1000





JUNE 21 - 1100



JUNE 21 - 1200

SITE BOUNDARY

ADDITIONAL SHADOWS

1: 3000
0 15 30 75 150m

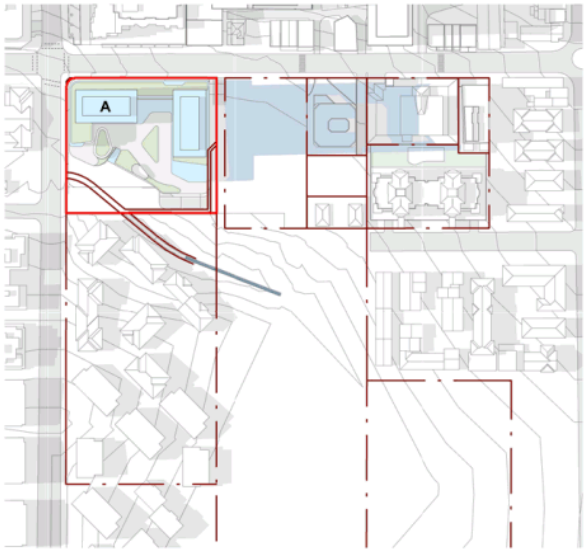
KANNFINCH

oakstand

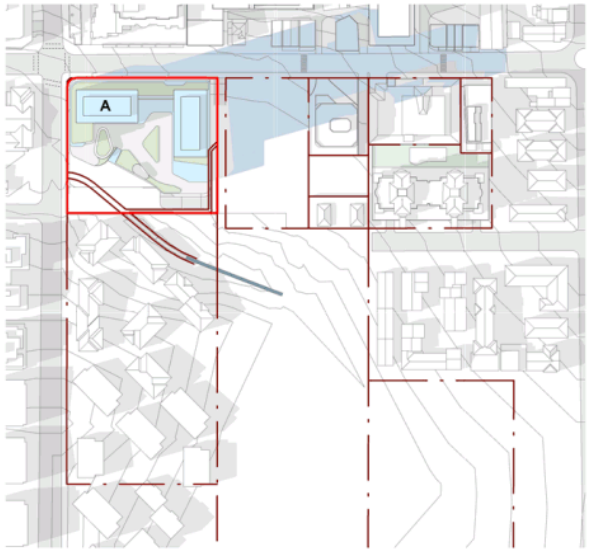
EPPING TOWN CENTRE
Rawson Street cnr Carlingford Road EPPING NSW

SHADOW DIAGRAMS
JUNE 21 - MID WINTER

DA.700
E
17.06.21



JUNE 21 - 1300



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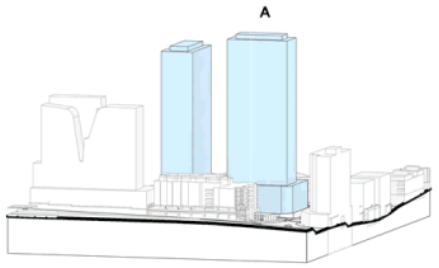
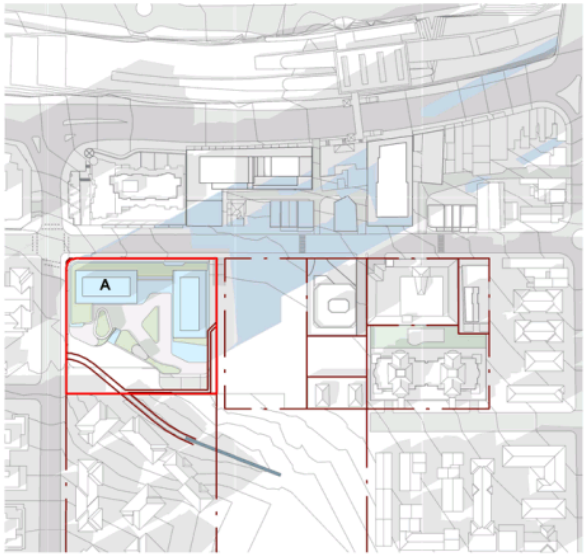




JUNE 21 - 1500

SITE BOUNDARY

ADDITIONAL SHADOWS

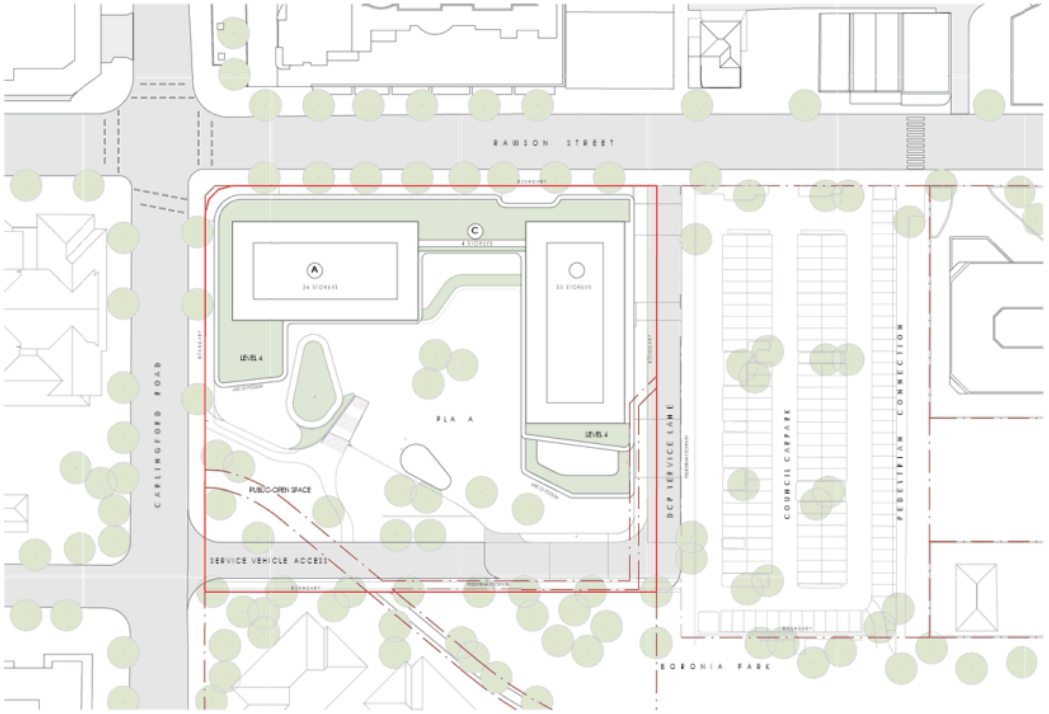
1: 3000
0 15 30 75 150m

KANNFINCH oakstand

EPPING TOWN CENTRE
Rawson Street cnr Carlingford Road EPPING NSW

SHADOW DIAGRAMS
JUNE 21 - MID WINTER

DA.701
E
17.06.21



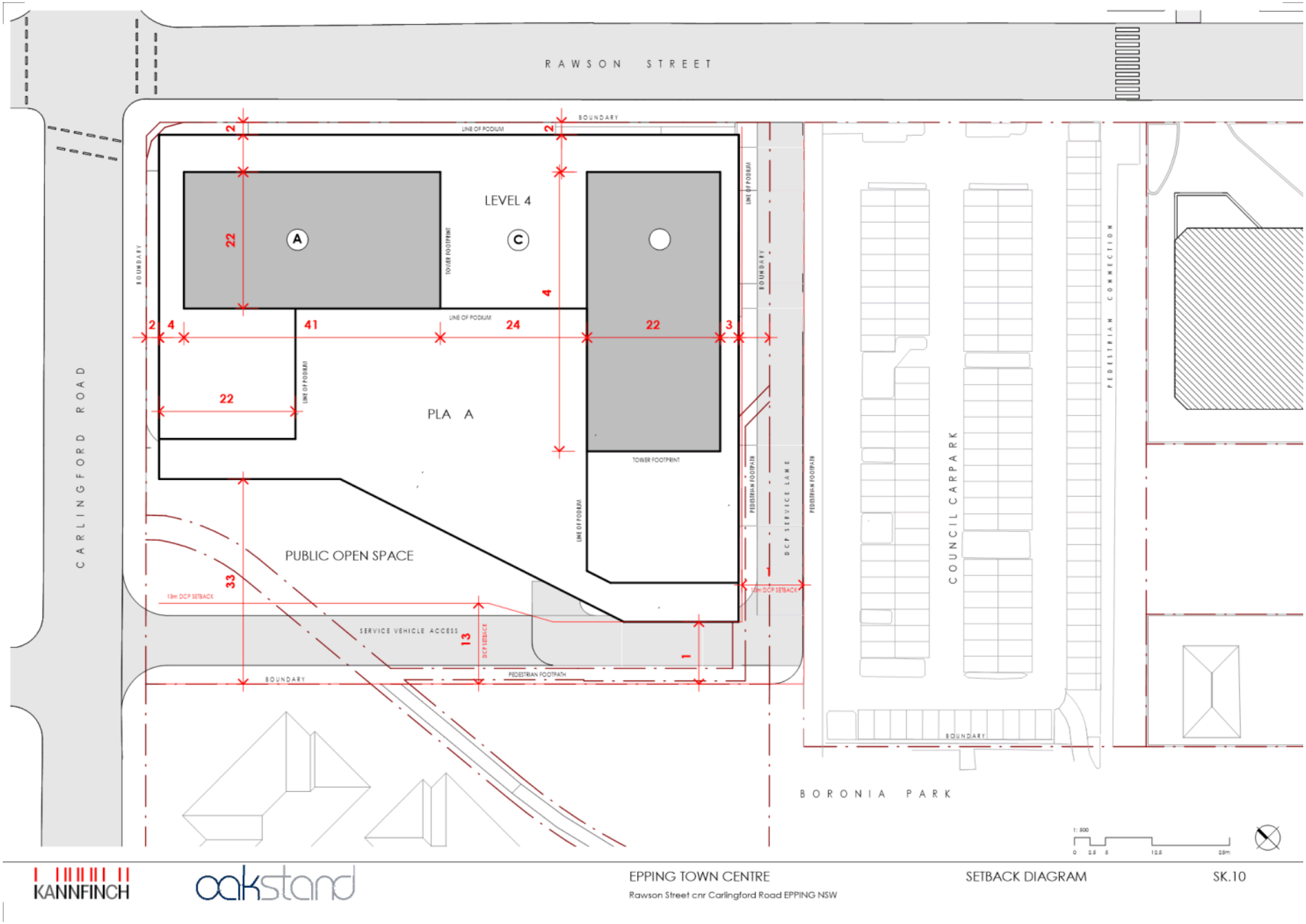
KANNFINCH

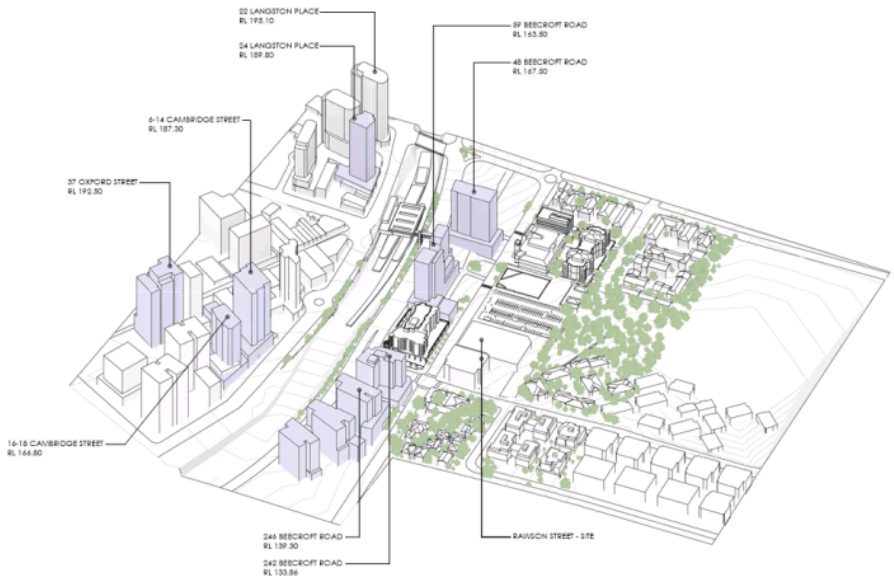
EPPING TOWN CENTRE

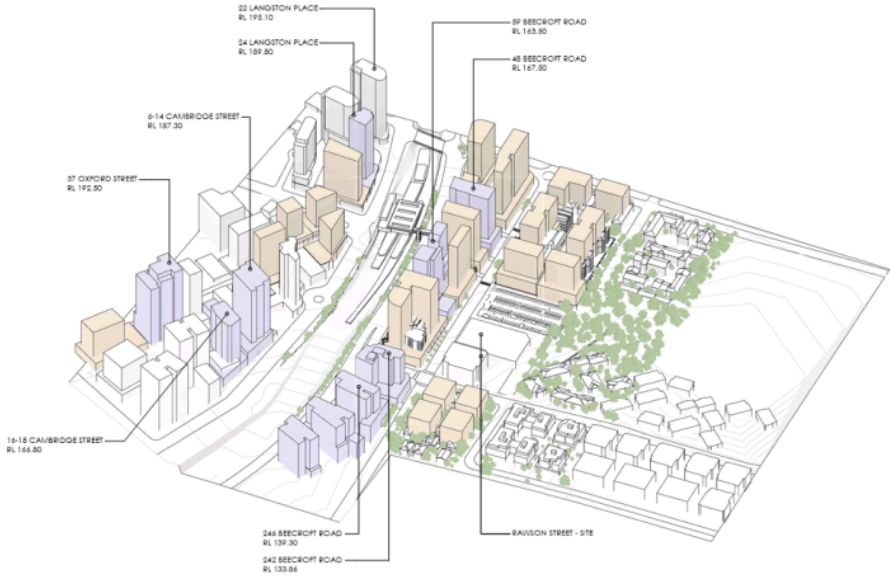
Rawson Street cnr Carlingford Road EPPING NSW

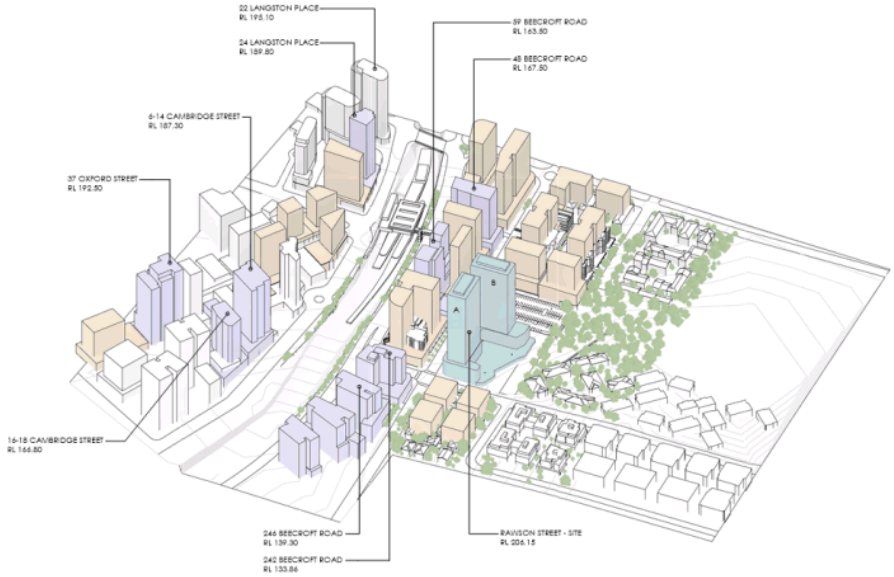
MASTERPLAN

SK.09


RAWSON STREET
CARLINGFORD ROAD
BOUNDARY
LINE OF PODIUM
TOWER FOOTPRINT
LEVEL 4
A
C
PLA A
PUBLIC OPEN SPACE
SERVICE VEHICLE ACCESS
PEDESTRIAN FOOTPATH
DCP SERVICE LANE
COUNCIL CARPARK
PEDESTRIAN CONNECTION
BORONIA PARK
13m DCP SETBACK
2
22
4
41
24
3
33
13
1
KANNFINCH
oakstand
EPPING TOWN CENTRE
Rawson Street cnr Carlingford Road EPPING NSW
SETBACK DIAGRAM
SK.10







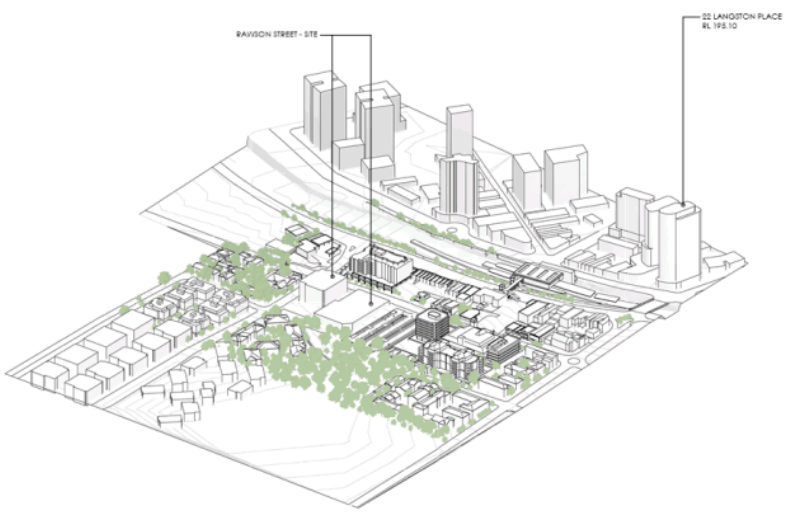
KANNFINCH

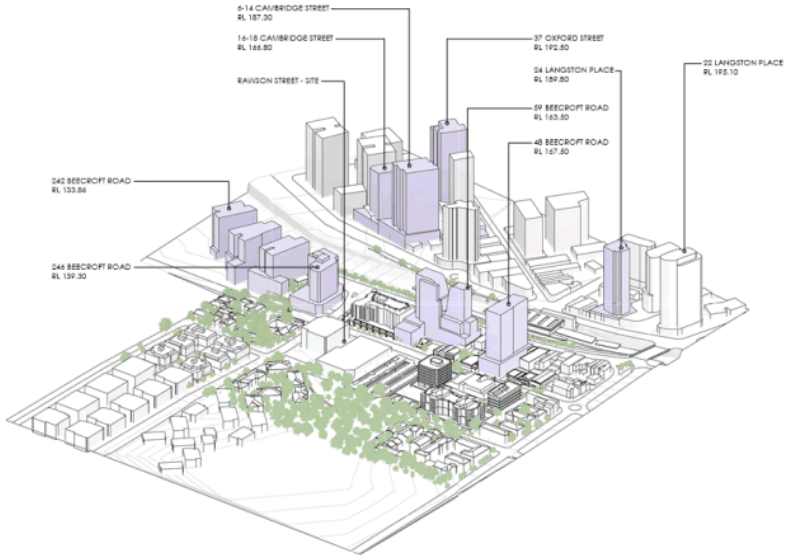
EPPING TO N CENTRE

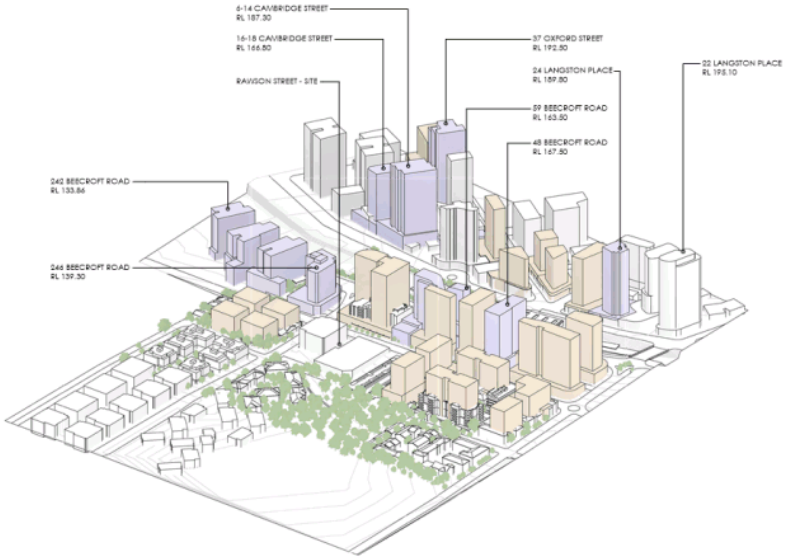
R S r r C r r d R d EPPING NS

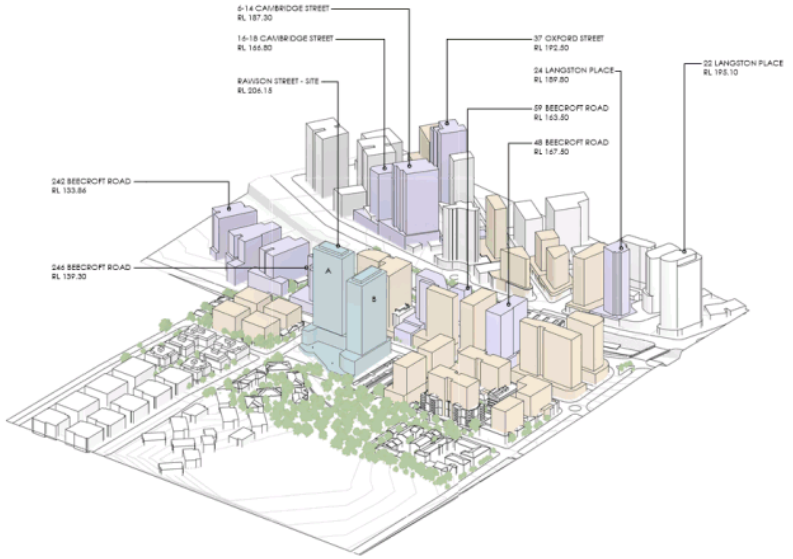
UR AN MASSING 1

SK 3









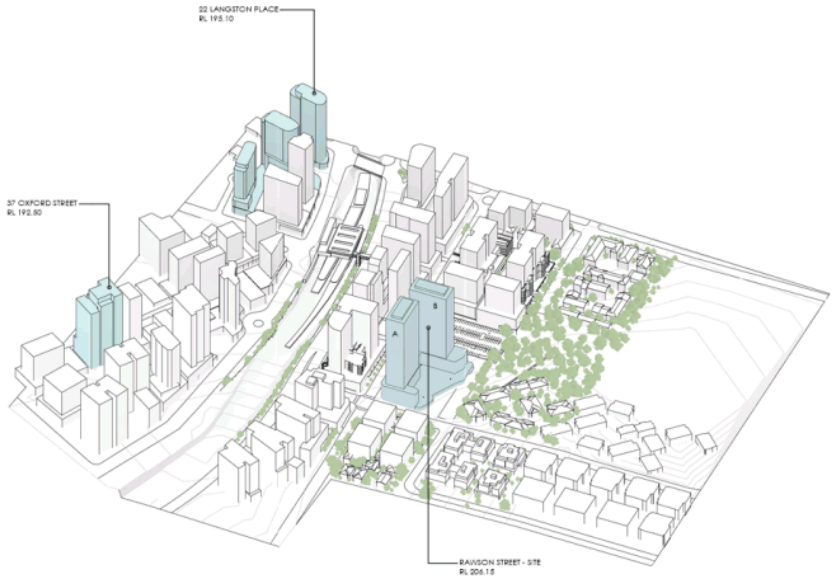
KANNFINCH

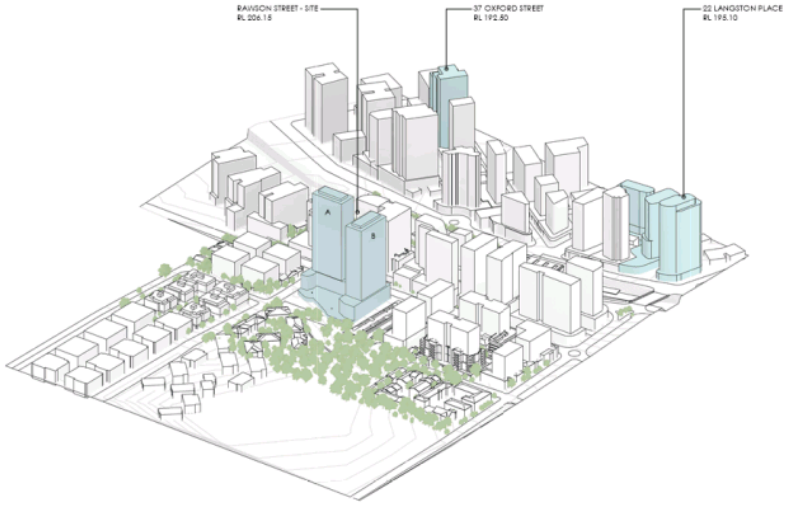
EPPING TO N CENTRE

R S r r C r r d R d EPPING NS

UR AN MASSING 2

SK 4





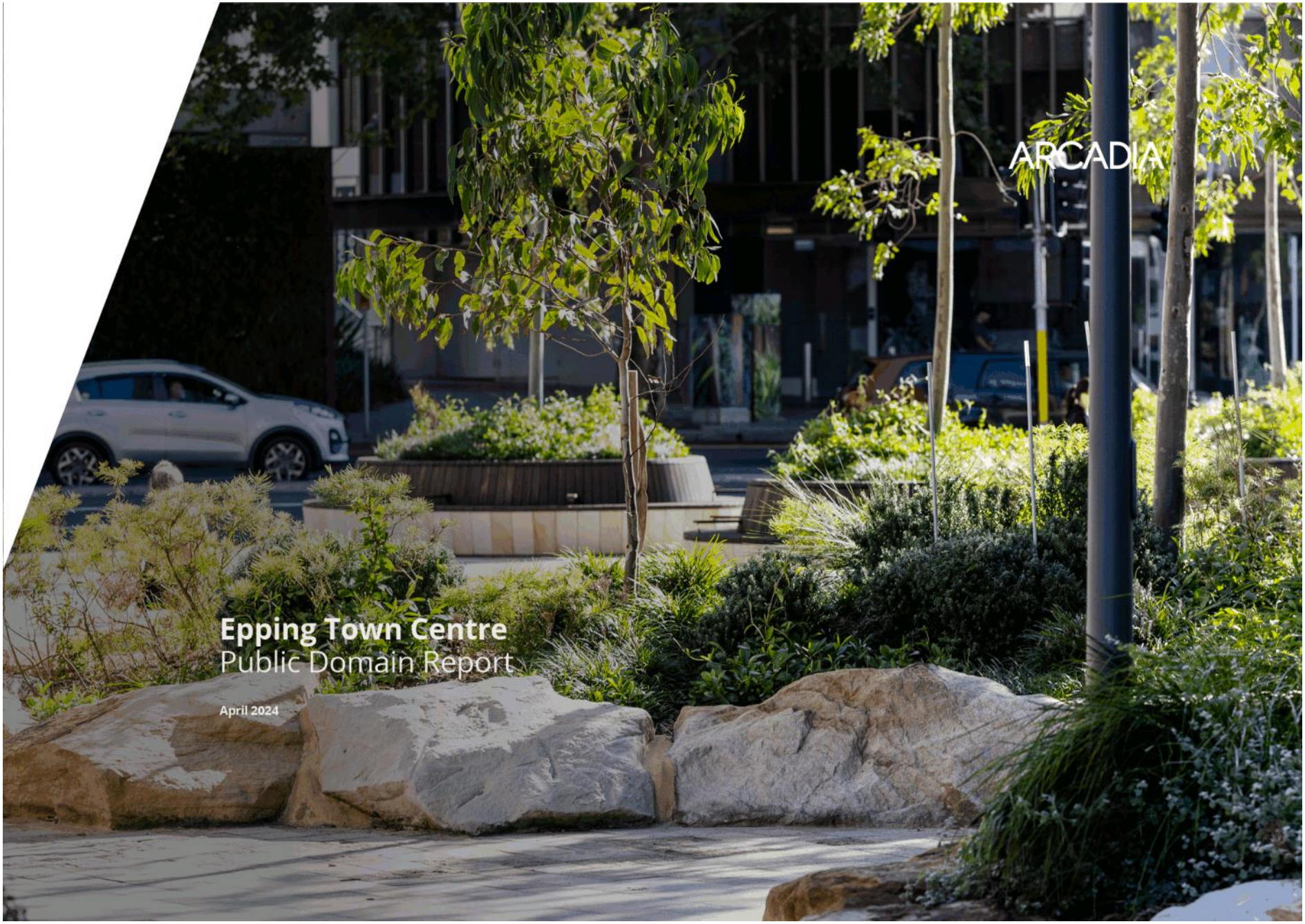
KANNFINCH

EPPING TO N CENTRE

R S r r C r r d R d EPPING NS

UR AN MASSING 3

SK


ARCADIA
Epping Town Centre
Public Domain Report
April 2024

Public Domain Plan

SITE BOUNDARY

1. **Main Body Unit Paver**
   Product: "Sesame Grey" & "Adelaide Black (Veined)" or "Austral Black" Size: 600x300x50, 400x300x50mm
   Finish: exfoliated/bush hammered
   As per PCC's Public Domain Guidelines, p105-107
2. **Vehicular Crossing Unit Paver**
   Product: "Sesame Grey" & "Adelaide Black (Veined)" or "Austral Black" Size: 400x300x50, 200x300x50mm
   Finish: exfoliated
   As per PCC's Public Domain Guidelines, p105-107
3. **Kerb Ramp Unit Paver**
   Product: "Sesame Grey" & "Adelaide Black (Veined)" or "Austral Black" Size: 400x300x50, 200x300x50, 600x300x50mm
   Finish: exfoliated
   As per PCC's Public Domain Guidelines, p105-107
4. **Street Trees**
   Waterhousea floribunda ' Green Avenue' and Lagerstroemia indica 'Natchez'
   As per PCC's Public Domain Guidelines, p108-110
5. **Garden Beds**
   Planted garden beds along verge
   As per PCC's Public Domain Guidelines, p108-110
6. **Lighting Pole**
   Large multi functinal pole (10m) with CCTV, 2x GPO, LEDs, Smart City
   Lighting Level: Category P2
   As per PCC's Public Domain Guidelines, p114-116, 182

Public domain upgrades detailed in this Public Domain Plan have been extracted from City of Parramatta's Public Domain Guidelines (July 2017). Further details table on page 4.

Any proposed upgrades will follow Figure 3.5 "Typical Street Type Layout - Town & Neighbourhood Commercial" on page 49 of the PDG.

City of Parramatta's Public Domain Guidelines

Information detailed in table below has been extracted from City of Parramatta's Public Domain Guidelines (July 2017).

	Streets				
	Carlingford Rd	**Rawson St**	**DCP Service Lane**	**Notes**	**Reference**
Paving	**Granite Flagstone** **Main Body** Range of grey granite flagstones in a variety of sizes, colours and finishes. **Vehicle Crossing** Granite flagstones to match the footpath treatment. Use smaller stone sizes on vehicle crossings as required to suit vehicle load. **Kerb Ramp** Granite flagstones to match the footpath treatment.	**Granite Flagstone** **Main Body** Range of grey granite flagstones in a variety of sizes, colours and finishes. **Vehicle Crossing** Granite flagstones to match the footpath treatment. Use smaller stone sizes on vehicle crossings as required to suit vehicle load. **Kerb Ramp** Granite flagstones to match the footpath treatment.	**Granite Flagstone** Subject to future approved design, may include special inserts	**Main Body** Product: ' Sesame Grey' & 'Adelaide Black(Veined)' or ' Austral Black' **Size** 600 x 300 x 50mm 400 x 300 x 50mm **Finish** Exfoliated/Bush hammered **Vehicle Crossing** Product: ' Sesame Grey' & 'Adelaide Black(Veined)' or ' Austral Black' **Size** 400 x 300 x 50mm 200 x 300 x 50mm **Finish** Exfoliated **Kerb Ramp** Product: ' Sesame Grey' & 'Adelaide Black(Veined)' or ' Austral Black' **Size** 400 x 300 x 50mm 200 x 300 x 50mm 600 x 300 x 50mm **Finish** Exfoliated	**City of Parramatta Public Domain Guideline July 2017** Page 105-107, page 209
Street Trees	**Planting within Setbacks Only** Brachychiton acerifolius; Jacaranda mimosifolia and planted garden bed surrounds *Not applicable to our public domain scope of works*	Waterhousea floribunda ' Green Avenue' and Lagerstroemia indica 'Natchez' Planted garden bed surrounds	*Not applicable to our public domain scope of works*	The creation of continuous tree planting trenches in CBD and town centre streets where soil volume is compromised	**City of Parramatta Public Domain Guideline July 2017** Page 108-110, page 116-171
Lighting	**Electrical authority pole with lamp upgrade** Lighting Level: Category V3	Large multi functinal pole (10m) with CCTV, 2x GPO, LEDs, Smart City Lighting Level: Category P2	Large multi functinal pole (10m) with CCTV, 2x GPO, LEDs, Smart City Lighting level: Category P6	Achieve vehicular and pedestrian lighting in accordance to AS/NZS 1158.1	**City of Parramatta Public Domain Guideline July 2017** Page 114-116; page 182

ARCADIA

INNOVATIVE

ITEM NUMBER	17.2
SUBJECT	FOR APPROVAL: Gateway Request - Planning Proposal to increase commercial floorspace in Epping Town Centre
REFERENCE	F2018/03032 - D07797520
REPORT OF	Team Leader Land Use Planning
PREVIOUS ITEMS	14.5 - Epping Town Centre Traffic Study and other Epping Planning Review Matters - Council - 09 Jul 2018 6.30pm

PURPOSE:
The purpose of this report is to progress a Planning Proposal to mandate an increase in commercial floor space on certain land within the Epping Town Centre. This report recommends giving approval for the CEO to prepare a Planning Proposal based on planning approach 'Option 3' (as detailed in this report) then forwarding a Planning Proposal to the Department of Planning, Industry and Environment with a request for a Gateway Determination.

RECOMMENDATION

(a) **That** Council delegates authority to the Chief Executive Officer to prepare a planning proposal which seeks the following amendments to *Parramatta Local Environmental Plan 2011* and *Hornsby Local Environmental Plan 2013* applying to all land in the B2 Local Centre zone in the Epping Town Centre, with the exception of 6-14 and 18A Bridge Street and 24-30 High Street, relating to Option 3 detailed in this report that:

i. Introduces new clauses which:
- Mandate a minimum amount of non-residential uses to be provided on the ground, first and second floors of any building facing a street of up to a maximum of 1:1 floor space ratio (FSR) of non-residential floorspace in addition to the mapped maximum floor space ratio. The clause shall also indicate that the FSR of residential development permitted on the site should not increase as a result of this requirement.
- Allow for an increase in maximum height of buildings from 48 metres in some parts of Epping and 72 metres in some parts of Epping up to 80 metres (approx. 24 storeys) where sites have a mapped FSR of 4.5:1 and from 72 metres up to 90 metres (approx. 28 storeys) where sites have a mapped FSR of 6:1, only where developments provide a minimum amount of non-residential uses of ground, first and second floors of any building facing a street.
- Ensure any change of use proposed on the first three levels would not allow residential uses.
- Apply an exception to that part of a building that faces a service lane or is required for entrances and lobbies, access for fire services or vehicular access associated or servicing residential accommodation above.

ii. Introduces a requirement that the proposed controls of the Planning Proposal apply to development applications determined once a Gateway Determination has been issued for this Planning Proposal.

(b) **That** the Chief Executive Officer forwards the Planning Proposal to the Department of Planning, Industry and Environment (DPIE) to request the issuing of a Gateway Determination on behalf of Council.

(c) **That** Council delegate authority to the Chief Executive Officer to prepare amendments to the relevant sections of the Parramatta Development Control Plan 2011 and Hornsby Development Control Plan 2013 to support the Planning Proposal relating to the following design controls, and place these on public exhibition with the Planning Proposal:

i. podium height controls;

ii. minimum floorplate dimensions;

iii. floor to ceiling heights for non-residential uses;

iv. location of services; and

v. building and podium setback controls.

(d) **That** Council advises the DPIE that the Chief Executive Officer will be exercising the plan-making delegations for this Planning Proposal as authorised by Council on 26 November 2012.

(e) **That** Council delegate authority to the Chief Executive Officer to correct any minor anomalies of a non-policy and administrative nature that may arise during the plan-making process.

(f) **That** within 5 years of the planning controls being made as an LEP amendment, that a review be undertaken of the effectiveness of the controls relating to the mandatory provision of a minimum level of commercial floorspace in the B2 Local Centre zone within the Epping Town Centre and any associated recommendations and this review be reported to Council.

(g) **That** Council continue to work with the State Government to resolve traffic issues in Epping.

(h) **Further that,** Council note the Local Planning Panel's advice to Council at its meeting of 15 December 2020 is in support of the Planning Proposal, which is consistent with the Council Officer's recommendation in this report.

SUMMARY

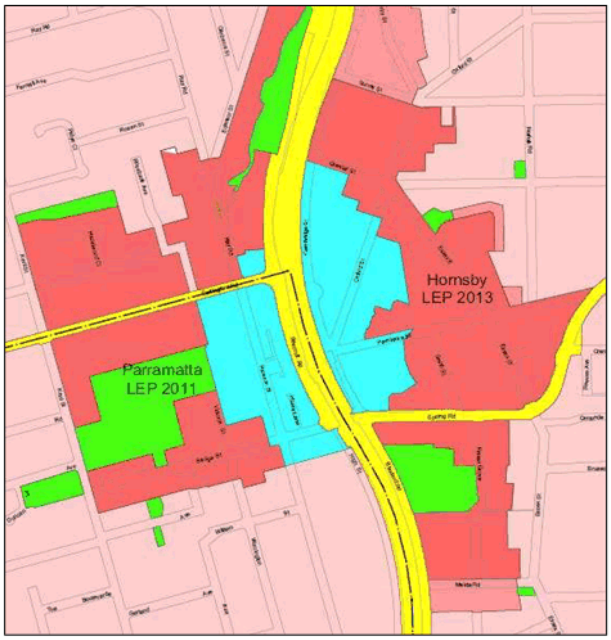
1. The loss of commercial floor space within the Epping Town Centre was a key planning issue examined by Council as part of Phase 1 of the Epping Planning Review (Review) undertaken between 2017 and 2018. The Review identified that since the 2014 Epping Urban Activation Precinct rezoning, new development within the B2 Local Centre zoning (refer **Figure 1**) has reduced the amount of commercial floor space (and therefore jobs) within the Epping Town Centre. Recent developments are typically replacing large and small-scale offices with shop top housing. These developments only provide ground floor retail or business premises with residential towers above and little or no floor space for other job generating activities.

2. This development type is inconsistent with the strategic vision set out in the Central City District Plan and Council's Local Strategic Planning Statement. This report seeks to provide options for Council to address this inconsistency.
3. This report considers three potential planning options in relation to the provision of commercial floor space in Epping, as follows:
   a) **Option 1** – no change to planning controls, that is, based on current development trends, provision of only ground floor retail/business floor space; or
   b) **Option 2** - mandate a minimum amount of non-residential floor space within the current maximum floor space ratio (FSR) and height controls; or
   c) **Option 3** - mandate a minimum amount of non-residential floor space in addition to the current permitted maximum floor space ratio and height controls.
4. This report outlines the potential advantages and disadvantages of each Option. The Council Officer assessment concludes that Option 3 should be pursued. This recommendation is based on the market's likely response to the proposed planning controls (as opposed to Option 2). Council Officers believe this approach will be the most likely to achieve the forecast additional demand for commercial floorspace in the Epping Town Centre.
5. It is acknowledged that there would be some adverse impact by pursing Option 3 in relation to increased overshadowing and traffic impact. However, on balance the impact is considered an acceptable compromise in order to practicably deliver the additional commercial floor space required to realise Epping as a thriving and vibrant employment centre.
6. It is noted that the three potential planning Options were presented to the Parramatta Local Planning Panel (Panel) at its meetings of 29 September and 15 December 2020. In its advice to Council at its meeting of 15 December 2020 the Panel is in support of the Planning Proposal, which is consistent with the Council Officer's recommendation in this report.

CURRENT PLANNING CONTROLS

7. This planning matter relates to B2 Local Centre zoned land in the Epping Town Centre. As indicated on **Figure 1** the Epping Town Centre is divided by two sets of planning controls - the *Parramatta Local Environmental Plan (LEP) 2011* and *Hornsby Local Environmental Plan (LEP) 2013.*

Figure 1: B2 Zoned Land within the Epping Town Centre shown in blue



8. Council's current Harmonisation Planning Proposal seeks to consolidate into one Planning Instrument a set of controls that will replace the controls in the five different Local Environmental Plans that currently apply in different parts of the City of Parramatta. This Planning Proposal has received Gateway Determination from the Department of Planning, Industry and Environment (DPIE) and at the time of writing this report, was placed on public exhibition between 31 August and 12 October 2020. There is no change proposed to the extent of the B2 Local Centre zoning within the Epping Town Centre under the Harmonisation Planning Proposal.

9. **Table 1** summarises the planning controls, which apply to the B2 Local Centre zoning, both currently and under the Harmonisation Planning Proposal.

Table 1 Summary of Planning Controls within the B2 Local Centre zoned sites in Epping Town Centre

	Maximum FSRs	Maximum Height of Building	Permitted Land Uses/Relevant clauses
Hornsby LEP 2013	6:1 & 4.5:1	72m & 48m	- Commercial uses, shop top housing, tourist and visitor accommodation and community facilities
Parramatta LEP 2011	6.1; 4.5:1 & 3:1	72m, 48m & 21m	- Commercial uses, shop top housing, tourist and visitor accommodation and community facilities
Harmonisation Planning Proposal	As above (no change)	As above (no change)	- Permissible land uses as above. - Clause requiring B2 zoned sites to include non-residential on the ground floor.

BACKGROUND

Epping Town Centre Urban Activation Process

10. On 14 March 2014, the then Department of Planning and Environment (Department) finalised the Epping Urban Activation Precinct (UAP) amendments to the Hornsby and Parramatta Local Environmental Plans (LEPs) via State Environmental Planning Policy (Epping Town Centre) 2013 ("the SEPP Amendment"). The SEPP Amendment provided capacity for approximately 10,000 additional dwellings and sought to revitalise the commercial and retail core adjacent to a major transport hub.

11. The FSR and height controls arising from the UAP are supported by controls in the relevant Parramatta and Hornsby DCPs. The provisions in both DCPs encourage new development within the Epping Town Centre to allocate a proportion of the development to non-residential uses. Hornsby DCP currently requires a 2 to 3 storey podium and Parramatta DCP currently requires 'up to' 4 storeys for commercial uses. Under current planning legislation, the role of DCPs have been weakened relative to their historical role, and are considered to be a guide, which can be varied as part of the development application process.

12. Therefore, since the 2014 rezoning, new development within the B2 Local Centre zoning has resulted in the development of residential floorspace at the expense of existing office floorspace. That is, development of shop top housing, with ground floor retail or business uses and residential towers above. This issue and others relating to the consequences of the loss of commercial floorspace is discussed in more detail below.

Epping Planning Review Project – Stage 1

13. In December 2016, the Epping Planning Review (Review) was commenced by the City of Parramatta Council. The scope of the Review was to address the unintended consequences of the planning control amendments brought into effect in March 2014. One of the key issues explored by the Review was the loss of commercial floorspace within the Epping Town Centre. Background on the Review and a summary of key issues as outlined in the Epping Planning Review Discussion Paper (refer Section 8 for commercial floorspace) can be found at https://www.cityofparramatta.nsw.gov.au/councilprecinct-planning/epping-planning-review.

14. As part of the Review, Council commissioned SGS Economics and Planning to undertake a Commercial Floor Space Study to understand the loss of commercial floor space and Epping's role as a centre and therefore the future demand for retail and commercial floorspace. The Commercial Floor Space Study (the Study) is provided at **Attachment 1**.

15. Key issues identified in the Study include:
    a. Recent development activity has seen the development of new residential floor space at the expense of existing commercial floor space. The market has determined that residential is the highest yielding land use, at the expense of existing commercial floor space.
    b. The current planning controls are likely to continue to result in the loss of commercial floor space and, best case, replacing current ground level retail offerings.

c. Due to some landowner desire to maintain the redevelopment potential of their land, there is currently very little commercial floor space on a long-term lease or a lease without a demolition clause. This creates an environment of uncertainty for existing and potential commercial tenants which has seen commercial uses unable to access appropriate floor space to support their business.

16. In order to address these key issues, the Study modelled three employment scenarios for Epping:
    a. **Low scenario** - where Epping is a population serving centre and represents a further reduction in office floor space;
    b. **Medium scenario** - where Epping is a local centre (meeting the demands of a local catchment) and forecasts demand for 31,845sqm to 2036 of office floor space. This is in line with current provision; and
    c. **High scenario**, where Epping fulfils its function as a sub-district centre (as a professional services hub) and forecasts demand for 55,616sqm to 2036 of office floor space.
17. The Study concluded:
    a. The office space demand for Epping is likely to sit between the medium and high scenario and therefore supportable demand of between 40,000sqm and 45,000sqm at 2036 is considered the most likely limit for office floor space for Epping. It is noted that the Study's reference to office floor space includes knowledge intensive, population serving and health and education.
    b. The forecast demand for retail floor space in Epping to 2036 is 13,000sqm.

18. Current patterns of development are unlikely to deliver the quantum of commercial floor space required by 2036. The market is more likely to deliver an acceptable level of retail floor space at ground level. Therefore, the Study recommends applying a non-residential floor space ratio (excluding visitor and tourist accommodation) within the B2 Local Centre zone to ensure these uses are accommodated in a truly mixed-use development providing services for the local and surrounding population.

Council Reports and Resolutions

19. On 9 July 2018, a report was considered by Council that detailed the findings of the Epping Planning Review, including the findings of the Commercial Floor Space Study and community feedback in relation to the loss of commercial floor space in Epping Town Centre. The 9 July 2018 Council report and minutes can be found at Item 18.4: https://businesspapers.parracity.nsw.gov.au/Open/2020/OC_09062020_AGN_585_AT_WEB.HTM and the resolution at: https://businesspapers.parracity.nsw.gov.au/Open/2020/OC_09062020_MIN_585.HTM#PDF2_ReportName_9025.
20. Specifically in response to the loss of commercial floor space, Council (part) resolved at its meeting of 9 July 2018:
    (l) ***That** a Planning Proposal including all necessary background studies and analysis be prepared to progress the recommended LEP amendments detailed in this report relating to new controls to require the provision of commercial floor space in the Town Centre and that the Planning*

Proposal and associated material be reported to Council for endorsement before it is forwarded to the Department of Planning and Environment seeking any Gateway Determination for the planning proposal.

21. Further, it is noted that Council at its 9 July 2018 meeting resolved to not support any planning proposal or preliminary planning proposal which seeks to deliver additional housing to what can be achieved under the current planning controls, unless it seeks to address a planning issue identified in the Council's Epping Planning Review process related to:
    a. commercial floor space in Epping Town Centre; or
    b. the planning controls that should apply to the heritage conservation areas or areas that interface with the High Density Residential zones surrounding Epping Town Centre.

KEY ISSUES

Fulfilling Epping's role as a Strategic Centre

22. Epping is identified as a Strategic Centre in the Greater Sydney Commission *Central City District Plan (2018)* (District Plan),and as a result of this was also identified as a Strategic Centre in Council's Local Strategic Planning Statement (LSPS). Further details on the objectives/vision for Epping set out in these documents is included in paragraphs 31 – 40 of the report considered by the Local Planning Panel which can be viewed utilising this link. https://businesspapers.parracity.nsw.gov.au/Open/2020/LPP_29092020_AGN_641_AT.PDF

23. The employment targets for Epping Town Centre in the District Plan and Council LSPS and compared to the recommendations of the Commercial Floor Space Study are outlined in Table 2 below.

Table 2: Summary of job targets for Epping Town Centre

Strategy/ Study	Job Target / Project Demand to 2036	Notes
Central District Plan (March 2018)	7,000 – 7,500	
Epping Commercial Floor Space Study (SGS Economics 2017)	5,674- 9,353	The jobs forecast range is based on between a 'medium' to 'high' employment forecast scenario. The SGS Study notes the high scenario is aspirational and in light of the competitive offer of Epping, the supportable demand for office floor space sits between 40,000 & 45,000sqm (by 2036) and 13,000sqm of retail floor space (by 2036).
Council's Local Strategic Planning Statement (March 2020)	9,400	This jobs forecast is based on a 'high employment scenario' as per the Commercial Floor Space Study (SGS) and as identified in the Study, the high scenario is aspirational.

24. The Census employment figures for the Epping Town Centre indicate a loss of 1,827 jobs over a 5 year period, as follows:
    - 2011 Census – 5,550 jobs; and
    - 2016 Census – 3,723 jobs.

    It is expected that this loss will continue with the types of development occurring in the Town Centre.

25. Council Officers have undertaken analysis of sites which have redevelopment potential zoned B2 Local Centre within the Epping Town Centre (excluding those sites that have already realised redevelopment potential). The analysis assumes that future development of these sites would include ground floor retail and first and second floor commercial (or other non-residential uses).
26. The analysis found that there is potential for these sites to yield approximately 57,000sqm of non-residential floor space comprising:
    a. Approximately 10,750sqm of retail floor space on the ground floor; and
    b. Approximately 46,250sqm of commercial or non-residential floor space on the first and second storeys.
27. The above analysis demonstrates that by providing non-residential within the first three levels of development, that the projected demand identified in the SGS Commercial Floor Space Study of between 40,000 and 45,000sqm of office floor space may be met, and the projected demand of 13,000sqm of retail floor space by 2036 could be met (noting that the existing non-residential floor space is not included in calculations).
28. It is important to note that larger sites in Epping (over 6,500sqm in site area) that were included in the projections above, could accommodate significantly more non-residential floor space through their redevelopment within the Epping Town Centre and therefore the projected overall non-residential floor space may further increase.

Options for Achieving Non-Residential Floor Space

29. In order to achieve commercial floor space targets for Epping (described above), there are three potential planning approaches, as follows:
    a. **Option 1 –** no change to planning controls and let market conditions dictate the commercial floor space achieved, based on recent development trends this may result in only ground floor commercial (retail) being delivered however market conditions could change over time; or
    b. **Option 2** - mandate a minimum amount of non-residential floor space within the current maximum floor space ratio controls; or
    c. **Option 3** - mandate a minimum amount of non-residential floor space in excess of the current maximum floor space ratio (FSR).
30. The Commercial Floor Space Study concludes that Option 1 would likely result, based on current development trends and permissibility of shop top housing within the B2 Local Centre Zone, in retail or business on the ground floor with residential towers above. Therefore, over time this would result in further commercial floor space and job loss within the Epping Town Centre.
31. Options 2 and 3 would provide for future commercial and retail floor space targets for Epping to be met, and would require changes to planning controls, that is, an amendment to the Hornsby LEP 2013 and Parramatta LEP 2011 via a Planning Proposal. Therefore, an assessment of these two options is presented in more detail in this report below.

Commercial Floor Space Traffic Study

32. In order to understand and compare the traffic impact of the planning options for increasing commercial floor space in the Epping Town Centre, Council commissioned EMM Consulting to undertake a traffic study. The Commercial Floor Space Traffic Study (February 2020) is provided at **Attachment 2**.

33. The Commercial Floor Space Traffic Study (the Traffic Study) modelled three planning scenarios at the year 2026:
    a) Scenario 0 – Baseline - a forecast development scenario of the existing pattern of development.
    b) Scenario 1 - a minimum 3 storeys be provided of non-residential uses within the existing FSR (i.e. Option 2).
    c) Scenario 2 – a minimum of 3 storeys be provided of non-residential uses in addition to the existing FSR (i.e. Option 3).
34. Each of the key impacts under the morning and afternoon peaks are described below. Note that the term 'level of service' refers to how well the road intersection is operating from a commuter's perspective. Typically, six levels of service are defined and each is assigned a letter designation from A to F, with level of service 'A' representing the best operating conditions, and level of service 'F' the worst.

Traffic Impact at the Morning Peak

35. The key results in relation to the morning peak are summarised in **Table 3** below. It is noted that four key intersections will be already operating under the Baseline Scenario (at 2026) at highly congested traffic conditions (level of service F) – these are Carlingford Road/Midson Road; Carlingford Road/Ray Road/Rawson Street; Carlingford Road/Beecroft Road; and Epping Road/Essex Street. Both Scenarios 1 and 2 will further increase the delays to three of these intersections during the morning peak. In addition, two intersections will experience changes to the level of service under both Scenarios.

Table 3. Summary of Impact on Key Intersection at Morning Peak for each Scenarios

Intersection	Summary of Impact of Scenarios 1 & 2 against Base Case
Carlingford Rd/Ray Road/Rawson Street	Will continue to operate at level of service F - with increase in intersection delays less under Scenario 1 (59.3 sec) than Scenario 2 (134.2 sec).
Carlingford Road/Beecroft Road	Will continue to operate at level of service F - with increase in intersection delays slightly greater under Scenario 1 (17.8 sec) than Scenario 2 (17.4 sec).
Epping Road/Blaxland Road/Langston Place	Will change from a level of service C (baseline) to level of service D (both Scenarios).
Epping Road/Pembroke Street	Will change to a level of service A (baseline) to level of service B. Both levels of service A and B are acceptable levels of service.
Epping Road/Essex Street	Will continue to operate at level of service F - with increase in intersection delays under both Scenarios 1 and 2. The increase in delay time is less in Scenario 1 (17.7 sec) than under Scenario 2 (19.7 sec).
Carlingford Rd/Midson Road	Will continue to operate at level of service F – with increase in intersection delays slightly greater under Scenario 1 (17.8 sec) than under Scenario 2 (17.4 sec).

Traffic Impact at the Afternoon Peak

36. In the afternoon, peak traffic conditions generally perform better than the morning peak, which is primarily believed to be due to the Epping Bridge widening relieving westbound traffic flows.

37. There are no changes to service levels for any of the key intersections under Scenarios 1 or 2 (as compared to Baseline 2026). However, the Carlingford Road/Beecroft Road intersection, which will be operating at over capacity traffic conditions (level of service F), will experience increases in the level of delay (37 and 49.5 seconds respectively) under Scenarios 1 and 2.

Traffic impact - Conclusions

38. It is acknowledged that there are, and will be, highly congested traffic conditions in Epping under the current planning controls, and that the proposal to mandate additional non-residential floor space will result in additional delays at identified intersections in the peak (in the short to medium term). Notwithstanding this, it is recommended the mandating of non-residential floor space within Epping Town Centre be pursued.

39. As a result of changes to planning controls, there will be a short to medium term adverse traffic impact, however this must be balanced with the long term pursuit of the strategic goal of making Epping a thriving Town Centre. There are demonstrable benefits from having an activity and employment based centre which is best placed to serve the needs of the broader community.

40. Furthermore, Council will continue to focus its efforts on delivering and advocating for the necessary traffic and transport improvements required in Epping. By taking advantage of Epping as a public transport hub this will continue to assist in resolving the road based transport issues, and seeking improvements in public transport provisions in areas east and west of Epping to reduce the levels of private vehicle through traffic, which is currently the primary source of congestion problems in the Epping Town Centre.

41. Whilst this approach would result in additional short term congestion, in the longer term it would help establish Epping as a thriving centre with a sustainable mix of use, and rely on future transport improvements that encourage use of other forms of transport to resolve the road based transport issues.

Height of Buildings and Potential Overshadowing

42. If Option 3 was pursued as a Planning Proposal, it would result in an increase in density and height controls on B2 zoned sites within the Epping Town Centre. **Table 4** and **Figure 2** indicate the current maximum FSR and heights available under the LEPs and proposed FSR and heights that would be required to accommodate the additional commercial floor space provision under Option 3. This is based on a modelled development of a 3 storey commercial podium and residential tower above.

Table 4: Proposed FSR and Height of buildings under Option 3

Current Maximum FSR and Height of Building (HoB) Controls on B2 sites in Epping	Proposed Maximum FSR and Height of Building (HoB) Controls on B2 sites in Epping
6:1 and 72 metres (22 storeys)	7:1 FSR and 90m (28 storeys)
4.5:1 and 72 metres (22 storeys)	5.5:1 FSR and 80m (24 storeys)
4.5:1 and 48 metres (15 storeys)	5.5:1 FSR and 80m (24 storeys)
3.5:1 and 21 metres (6 storeys)	No change proposed. As detailed below the sites are at 6, 8, 10, 12, 14 and 18A Bridge Street and 24-30 High Street and have shadow impact on adjacent residential heritage areas.

Figure 2: Proposed Building Height and FSR changes in Epping Town Centre

43. Comprehensive urban design analysis was undertaken by Council's City Design Unit to devise proposed maximum FSR and heights. Background to the urban design analysis and resultant FSR and heights are detailed in the Local Planning Panel reports of 29 September (refer to paragraphs 76 to 82) and 15 December 2020 (refer to paragraphs 17 to 25) which can be viewed utilising these links.
https://businesspapers.parracity.nsw.gov.au/Open/2020/LPP_29092020_AGN_641_AT.PDF

https://businesspapers.parracity.nsw.gov.au/Open/2020/LPP_15122020_AGN_576_AT.PDF

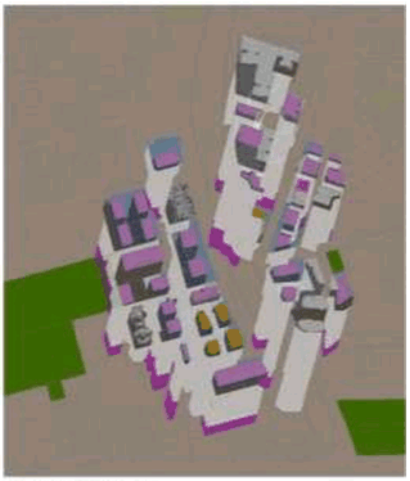
44. The urban design testing highlights the need for additional height to accommodate the additional commercial floor space (between 2 to 5 storeys depending on the size and shape of the site).

45. Additional height is also required to rectify the historical 'mismatch' between the current height and density (FSR) controls for B2 Local Centre zoned sites in Epping Town Centre. Those areas within the B2 zone where the increase in height goes from 48m to 80m is outlined above in **Table 4** and **Figure 2**. As detailed in the Local Planning Panel report of 29 September 2020, the increase in height is justified due to the history of consistent use of Clause 4.6 for substantial height variations and the need to gain better tower form and separation outcomes on those sites which have irregular subdivision patterns. It is acknowledged that not all sites will require this additional height.

46. An impact of additional density and height (and therefore taller buildings) is an increase in overshadowing. The difference in overshadowing extent between Option 2 (current planning controls) and Option 3 (additional height and density to the current planning controls) was calculated by Council's City Design Unit via a 3D model for all B2 Local Centre zoned sites in Epping Town Centre. The shadows cast were analysed on an hourly basis between 10am and 2pm on 21 June (winter solstice), as this is the time of the year that the sun is lowest in the sky and the shadows cast are the longest and is provided at **Attachment 3.**

47. **Figures 3 and 4** below provide a snapshot from the shadow analysis at 11am and at 1pm on 21 June. The pink shaded area indicates the potential net increase in overshadowing caused by increasing the height and density to accommodate an increase in commercial floor space. It is noted that the grey areas include both the shadow under the existing planning controls (Option 2) and shadow from Option 3 (therefore no resultant net increase of shadow).

Figures 3 and 4: Net shadowing increase (shown in pink) between Option 2 and Option 3 on B2 Local Centre zoned sites in Epping Town Centre on 21 June at 11am and at 1pm.



21 June 11:00am

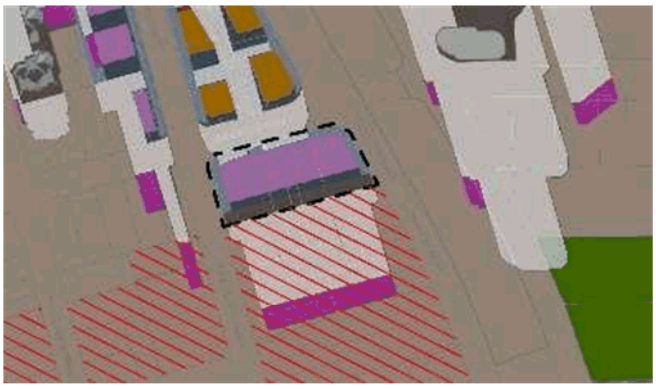
21 June 1:00pm

48. The overshadowing analysis at **Attachment 3** shows that any additional overshadowing (shown in pink) falling on the edge of Boronia Park, the residential areas to the south west of the Epping Town Centre and over the railway line between 10am and 11am, is marginal and has progressed further eastward by 12 midday. Therefore the overall net additional overshadowing caused by Option 3 for the majority of B2 sites is considered acceptable.

49. However it is noted that the additional net shadow (shown in pink) caused by additional height and density at 6, 8, 10, 12, 14 and 18A Bridge Street and 24-30 High Street largely impacts those sites to its immediate south for the majority of time between 10am and 2pm (refer **Attachment 3** and **Figure 5**). **Figure 5** below highlights the overshadowing impact at 12pm as a result from an increase in density and height from these sites. The sites impacted are located along Rawson and High Streets, are low density residential areas and sit within the Epping Eastwood Heritage Conservation Area under the Parramatta LEP 2011. It is therefore recommended that the B2 Local Centre sites 6, 8, 10, 12, 14 and 18A Bridge Street and 24-30 High Street be excluded from any planning proposal for Option 3.

50. The exclusion of these sites would not impact substantially on the delivery of commercial floor space in the future, as the sites have a current maximum FSR of 3:1 and height of buildings of 21 metres, the lowest density and height controls in the Epping Town Centre.

Figure 5: Additional overshadowing at 12 midday (shown in pink) onto the Epping Eastwood Heritage Conservation Area and residential area (shown in red hatched line) by sites along Bridge and High St (shown in black dash line).



Market Response

51. Another key issue to consider when examining how to achieve an increase in commercial floor space in Epping Town Centre is how the market - developers and/or landowners - will respond to Options 2 and 3.

52. A key risk for the implementation of Option 2 (to mandate a minimum amount of commercial floor space within the current height and FSR controls), is that the market will attempt to avoid the amendment to the planning controls. Based on development trends since the 2014 rezoning of Epping Town Centre, the market has determined for Epping that residential is the highest yielding land use, that is, residential floor space gains higher financial returns than commercial floor space. Option 2 will result in displacing current allowable residential floor space for commercial floor space within shop top housing development.

53. The timeframe for a planning proposal to be finalised, that is, the legal amendment to the local environment plan (LEP), is between 12 and 18 months. In the time it takes to process the planning proposal for Option 2, it is anticipated that landowners / developers will lodge development applications for shop top housing developments to ensure that they realise the land's development potential. A standard length of a development approval is for 5 years. Therefore the key achievement of increasing commercial floor space may be lost within the timeframe for processing the planning proposal and the length of time a development approval stands.

54. Alternatively Option 3, would result in an increase in commercial floor space whilst maintaining the residential development potential on any site. It is anticipated that the market would respond positively to Option 3 and the delivery of an increase in commercial floorspace in Epping Town Centre.

PLANNING PROPOSAL – OPTION 2 OR 3

55. Three potential planning approaches have been identified in relation to the provision of commercial floor space in Epping. As Option 1 will likely continue to result in the loss of commercial floor space and does not address Epping as a Strategic Centre it is recommended that this option is not pursued.

56. As Options 2 and 3 would require potential changes to planning controls, they each would result in the need to prepare a planning proposal to amend the Hornsby LEP 2013 and Parramatta LEP 2011. Council Officers recommend pursuing Option 3 as a planning proposal. An assessment of the relative merits Options 2 and 3 is summarised below.

Option 2 - mandate a minimum amount of non-residential floor space within the current maximum floor space ratio and height controls.

57. As detailed in the assessment section of this report, Option 2 results in some short to medium term traffic impact, however Council will continue to build, plan for and advocate for improvements to the road network in Epping and to take advantage of the public transport centre it has become.

58. Although on paper Option 2 would deliver an increase in non-residential floor space, practicably it is unlikely the market would respond favourably to the proposed controls. Council may experience a rush of development applications lodged for sites in Epping by landowners and developers in order to avoid the proposed controls. This would result in a lost opportunity to deliver commercial floor space within Epping Town Centre, in most cases a permanent loss due to the strata of residential units, which would be unlikely to be redeveloped again within 50 to 80 years.

Option 3 - mandate a minimum amount of non-residential floor space in excess of the current maximum floor space ratio (FSR).

59. Option 3 involves increasing the commercial floor space requirements by amending the height and density (FSR) controls to retain, where it results in minimal impact, an FSR for residential equivalent to existing levels. This would mean increases in overall density and building heights but makes delivery of more commercial floor space more viable.

60. Landowners or developers may support Option 3 as it would not decrease the residential potential available on a site, which is currently viewed by the market as the highest yielding land use. However it is acknowledged that concerns in relation to any increase in building height and density of development in and around Epping are issues local residents and other stakeholders raised during the Epping Planning Review.

61. Traffic impact in the morning peak, in the short to medium term, would be greater than Option 2 (refer to paragraphs 38-41 above), however as stated above, this must be balanced with the long term pursuit of creating a vibrant employment based Town Centre. It is also recognised that further traffic and transport improvements need to be advocated for and undertaken by Council to ease congestion.

62. The overshadowing analysis discussed suggests the impact earlier in this report is within acceptable limits except for the shadow cast by sites at 6, 8, 10, 12, 14 and 18A Bridge Street and 24-30 High Street and therefore it is recommended that these sites be excluded from the planning proposal.

Recommendation - Option 3

63. Council Officers recommend that Council proceed with Option 3, to mandate a minimum amount of commercial floor space in addition to the existing height and density controls. Specifically, it is recommended to prepare a planning proposal which applies to the B2 Local Centre zoning of the Parramatta LEP 2011 and Hornsby LEP 2013 within the Epping Town Centre to:

a. Introduce a new clause which mandates a minimum amount of non-residential uses to be provided on the ground, first and second floors of any building facing a street of up to a maximum of 1:1 floor space ratio (FSR) of non-residential floorspace in addition to the mapped maximum floor space ratio. The clause shall also indicate that the FSR of residential development permitted on the site should not increase as a result of this requirement.
b. Allow for an increase in maximum height of buildings from 48 metres in some parts of Epping and 72 metres in some parts of Epping up to 80 metres (approx. 24 storeys) where sites have a mapped FSR of 4.5:1 and from 72 metres up to 90 metres (approx. 28 storeys) where sites have a mapped FSR of 6:1, only where developments provide a minimum amount of non-residential uses of ground, first and second floors of any building facing a street.
c. Ensure any change of use proposed on the first three levels would not allow residential uses. Apply an exception to that part of a building that faces a service lane or is required for entrances and lobbies, access for fire services or vehicular access associated or servicing residential accommodation above.
d. Introduce a requirement that the proposed controls of the planning proposal apply to development applications determined once a Gateway Determination has been issued for this Planning Proposal.

64. Regardless of which option is pursued, it is recommended for reasons of expedience that the Chief Executive Officer (CEO) be granted delegation to prepare and forward the Planning Proposal to the Department of Planning, Industry and Environment (DPIE) to request the issuing of a Gateway Determination on behalf of Council.

PARRAMATTA LOCAL PLANNING PANEL

65. As per the Ministerial direction issued on 27 September 2018, Council is required to refer all planning proposals prepared after 1 June 2018 to the Local Planning Panel (Panel) for advice before Council considers whether or not to forward them to the Department of Planning, Industry and Environment (DPIE) for a Gateway Determination. The Panel considered this matter at its meetings on 29 September and 15 December 2020.
66. The Panel meeting on 29 September 2020 considered a detailed assessment of the three planning Options for increasing commercial floorspace described in this report. The Panel Report and Minutes can be found at Item 5.2:
https://businesspapers.parracity.nsw.gov.au/Open/2020/LPP_29092020_AGN_641_AT.PDF
https://businesspapers.parracity.nsw.gov.au/Open/2020/LPP_29092020_MIN_641.PDF
67. The Panel advice to Council was consistent with the Council Officer recommendation to proceed with Option 3, however the Panel provided additional recommendations relating to the following matters.
    a. That a savings clause be explored whereby a development application must consider the proposal at a certain date, in order to prevent a rush of

development applications being lodged to avoid providing a mandated minimum provision of commercial floorspace.

b. That a more equitable solution to the amount of additional floor space awarded as bonus should be restricted to not more than 0.5:1, thereby reducing the potential overshadowing and other potential environmental impacts.

c. That a review be undertaken of the proposed amendments and their effectiveness, no later than 3 years from the commencement of the LEP and it be written into the Planning Proposal.

d. That Council undertake a campaign to advocate use of public transport and help find new ways to encourage its use over the private car.

68. Following the September 2020 Panel meeting Council Officers undertook additional analysis to address these recommendations. A further report was presented to the Panel on 15 December 2020 to address these matters. In addition further urban design testing that had been undertaken resulted in further clarification being provided to the Panel on the amount of additional floorspace that would be required to achieve the commercial floor space targets in the Epping Town Centre.

69. The 15 December 2020 Panel Report and Minutes can be found at Item 6.1:
https://businesspapers.parracity.nsw.gov.au/Open/2020/LPP_15122020_AGN_576_AT.PDF
https://businesspapers.parracity.nsw.gov.au/Open/2020/LPP_15122020_MIN_576.PDF

70. The Panel advice to Council was consistent with the Council Officer recommendation to proceed with Option 3 and advised Council to forward the Planning Proposal to the Department of Planning, Industry and Environment for the purposes of requesting a Gateway Determination.

DEVELOPMENT CONTROL PLAN

71. If Option 2 or 3 were pursued as a planning proposal, supporting controls would be drafted as an amendment to the Epping Town Centre controls contained in the Hornsby DCP 2013 and Parramatta DCP 2011. Potential draft DCP controls would relate to the following:

a. setting podium height controls to ensure appropriate height of podium at street level;

b. minimum floorplates dimensions for non-residential uses to ensure that floorplates are flexible for both office, and other non-residential uses to be located;

c. floor to ceiling heights for non-residential uses (which are higher than residential floor to ceiling heights);

d. location of services (to prevent the first three floors filling up with 'services'); and

e. new building and podium setback controls.

72. It is recommended that Council delegate authority to the CEO to prepare amendments to the relevant sections of the Parramatta Development Control Plan (DCP) 2011 and Hornsby Development Control Plan (DCP) 2013 to support the planning proposal relating to design controls and place these on public exhibition with the Planning Proposal.

POTENTIAL INFRASTRUCTURE FUNDING IMPLICATIONS

73. Under Council's Planning Agreement Policy (adopted 26 November 2018) Council may, at its discretion, enter into a planning agreement for a Planning Proposal. The landowner would be required to provide infrastructure contributions that are valued at least 50 per cent of the land value uplift under Council's policy.
74. In relation to Option 2, the proposed amendments to the planning controls do not result in any additional density or land uplift, therefore the Policy is not applicable. Furthermore, any future development (residential or non-residential uses) would need to pay development contributions to fund local infrastructure in accordance with the relevant development contributions plan.
75. In relation to Option 3, the proposed amendments to the planning controls would result in additional density and land uplift from commercial land uses. Council Officers recommend that no planning agreement be applied to these sites for the following reasons:
    a. Based on the historic pattern of development to date, the market has been reluctant to deliver additional commercial floor space, therefore any additional monetary payment requirement may further dissuade commercial floor space provision;
    b. This is line with Council's policy position contained in the Parramatta CBD Planning Proposal which is to prioritise employment-generating floor space and to not subject this floor space to community infrastructure provisions;
    c. No planning agreements were in place at the time of the 2014 Epping rezoning for those B2 Local Centre zoned sites already developed;
    d. It is not practical to require a VPA with every individual landowner in Epping to achieve a contribution and it is unlikely in the view of Council Officers that the DPIE would support a community infrastructure mechanism such as the one proposed in the Parramatta CBD Planning Proposal for a lower order centre such as Epping; and
    e. Development contributions will apply at the time of development.

PLAN MAKING DELEGATIONS

76. Delegations were announced by the Minister for Planning in October 2012, allowing councils to make LEPs of local significance. On 26 November 2012 Council resolved to accept the delegation for plan making functions. Council also resolved that these functions be delegated to the CEO.
77. Should Council resolve to proceed with this planning proposal, Council should exercise its plan-making delegations. This means that after the planning proposal has been to Gateway, undergone public exhibition and been adopted by Council, Council officers will deal directly with the Parliamentary Counsel Office in the drafting of the LEP amendment, which is then signed by the CEO before being notified on the NSW Legislation website.
78. It is therefore recommended that Council request the DPIE that Council be granted plan-marking delegation for this Planning Proposal

CONSULTATION

Stakeholder Consultation

1. The following stakeholder consultation has been undertaken in relation to this matter:

Date	Stakeholder	Stakeholder Comment	Council Officer Response	Responsibility
22 September 2020	Email advising of the report being considered by the Local Planning Panel at its meeting of the 29 September 2020 to: - President of the Epping Civic Trust - President of the Epping Chamber of Commerce	Two members of the Epping Civic Trust addressed the Panel and raised concerns in relation to the proposed height and density of Option 3. One member was supportive of Option 1 and the other was supportive of a business zoning to be established in Epping Town Centre.	Local Planning Panel (LPP) considered the stakeholder comment. (Note these matters have been addressed in the LPP and Council report).	LPP
4 December 2020	Email advising of the report being considered by the Local Planning Panel at its meeting of the 15 December 2020 to: - President of the Epping Civic Trust - President of the Epping Chamber of Commerce - Hornsby Shire Council	None	N/A	LPP

Councillor Consultation

2. The following Councillor consultation has been undertaken in relation to this matter:

Date	Councillor	Councillor Comment	Council Officer Response	Responsibility
28 July 2020	Epping Ward Councillors	Supportive of a planning approach to increase commercial floorspace in	Council Officers have subsequently provided the Epping Ward Councillors with updates on the drafting of the Planning Proposal including providing prior	City Planning Unit

		Epping Town Centre as per resolution of 9 July 2019.	notification to them on the reports made to the Local Planning Panel on 29 September and 15 December 2020.	

FINANCIAL IMPLICATIONS FOR COUNCIL

79. The preparation of the Planning Proposal and development control plan amendments and any subsequent public exhibition material would be prepared by Council Officers and therefore the costs are within the existing City Planning budget.

NEXT STEPS

80. If Council resolves to proceed with a Planning Proposal for Options 2 or 3, Council Officers will prepare a planning proposal document under the CEO delegation and it will be forwarded to the DPIE for a Gateway Determination.

81. If a Gateway determination is issued, the Planning Proposal will be placed on public exhibition in conjunction with an associated site specific DCP and the outcomes will be reported to the Local Planning Panel if any submissions are received. If no submissions are received, the matter will be reported directly to Council post-exhibition.

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Acting Executive Director, City Planning & Design

Brett Newman
Chief Executive Officer

ATTACHMENTS:

1⇩	Epping Commercial Floorspace Study	78 Pages
2⇩	Commercial Floorspace Traffic Study	64 Pages
3⇩	Shadow Analysis Epping Town Centre	1 Page

REFERENCE MATERIAL

Epping town centre Commercial Floorspace Study

Final report

City of Parramatta Council
June 2017

SGS Economics & Planning

Independent insight.

SGS Economics & Planning | Independent insight.

This report has been prepared for City of Parramatta Council. SGS Economics and Planning has taken all due care in the preparation of this report. However, SGS and its associated consultants are not liable to any person or entity for any damage or loss that has occurred, or may occur, in relation to that person or entity taking or not taking action in respect of any representation, statement, opinion or advice referred to herein.

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EXECUTIVE SUMMARY

SGS Economics and Planning has been commissioned by City of Parramatta Council to prepare a commercial floorspace study for the Epping town centre. This project forms part of the Epping Planning Review. The objective of this project is to identify the level of commercial (retail, office and business) floorspace required to meet current and future demand.

Method

This study has involved an extensive review of existing state and local planning documents to understand the current planning environment. The impact of these planning controls, including recent changes introduced through the Epping Priority precinct planning process have been examined through a review of recent development applications, planning proposals and preliminary planning proposals.

This report includes an examination of the demographic and economic profile of the Epping town centre as well as an analysis of current market trends impacting on the office and retail uses in the Epping town centre. This analysis includes a review of local trends and macroeconomic trends shaping these uses now and into the future.

Consultation has also been conducted to supplement this analysis. Consultation has been conducted with the following groups:
- City of Parramatta Council
- Epping Chamber of Commerce
- Local real estate agents
- Landowners in the Epping town centre (i.e. land zoned B2 Local Centre)

Community members have also been consulted through a community workshop to identify their current and desired uses of the Epping town centre.

Demand for retail and office floorspace has been forecast in light of these findings. Retail demand has been forecast considered the surrounding local retail market and current local expenditure profiles. Three scenarios have been forecast for office floorspace demand considering different roles for the Epping town centre.

Key findings

The Epping town centre is currently considered as a local centre in State planning documents, with recent planning through the Priority Precinct process highlighting future residential uses.
State planning documents identify Epping as a local centre, supporting the daily needs of the surrounding population. The Epping town centre is identified in the *Draft West Central Plan* as a local centre with the potential to operate as a commercial and retail node, subject to 'the right planning and investment'. The recent Priority Precinct process however has prioritised residential development in the Epping town centre, indicating that demand for office floorspace is likely to be redirected to other nearby employment centres, which may limit this potential node from being realised.

Prior to the Priority Precinct process, the Epping town centre contained a relatively even mix of industries, providing local retail and services as well as employment opportunities across a range of industries.
At the 2011 Census, there were 4,512 jobs in the Epping town centre accommodated in approximately 55,000 square metres of office floorspace and 12,900 square metres of retail floorspace. Recorded

employment was evenly split across the Grater Sydney Commission's four industry classes; knowledge intensive, population serving, industrial, and health and education. This split of jobs indicates that Epping is an accessible location, and has attracted jobs in industries that do not rely on local populations, such as knowledge intensive jobs in professional services.

Recent development activity has seen the development of new residential floorspace at the expense of existing office floorspace that has been supporting this local employment. The quantum of retail floorspace remains the same as existing sites are redeveloped.
Since new planning controls were introduced in 2014, a significant amount of development activity has been recorded in the Epping town centre and the wider Priority Precinct. The majority of development in the Epping town centre is for 'mixed use' development, with commercial floorspace to support retail and office uses on the ground floor and residential floorspace on the remaining floors. This is in spite of existing local design controls encouraging the first 2 to 3 storeys of new development in the town centre to be allocated to non-residential uses.

Epping continues to experience demand for retail and office floorspace, however development activity has seen commercial uses unable to access appropriate floorspace to support their business.
The Epping town centre remains a desirable location for businesses to locate. The high quality public transport infrastructure and connections across Greater Sydney continue to attract new and existing retail and office uses to the Epping town centre. However, there is currently very little commercial floorspace on a long term lease and/or a lease without demolition clauses and land owners aim to retain the potential to redevelop their site. This impacts on the operation and certainty of businesses and has seen high demand for existing floorspace.

In light of this demand, forecast population growth, the size and infrastructure investment in the centre, Epping is considered to function as a sub-District centre, playing a more significant role than other nearby local centres.
Given Epping's close proximity to other strategic centres at the metropolitan level and the factors identified above, the role of Epping now and into the future is considered to be a sub-district centre, which meets the needs of a local residential population as well as providing higher-order services and commercial space for small to medium sized businesses. This would place Epping between local and District centres in the Greater Sydney Commission's hierarchy.

In light of this sub-District centre function, over the next 20 years there is forecast demand for 13,000 square metres of retail floorspace and 55,616 square metres of office floorspace in the Epping town centre.
These numbers represent the total demand for floorspace to 2036. This quantum of commercial floorspace is forecast to support the functioning of the Epping town centre to meet the needs of surrounding residents and to provide diverse employment opportunities in small to medium enterprises in a highly accessible location in Greater Sydney.

Current patterns of development are unlikely to deliver the quantum of floorspace required by 2036. A non-residential floorspace ratio is recommended as a means to deliver commercial floorspace.
A minimum non-residential floorspace ratio requiring a proportion of floorspace in new developments for commercial uses is recommended across the Epping town centre to ensure these uses are accommodated in truly mixed use developments providing services for the local and surrounding population, and enabling Epping to fulfil its role as a sub-District centre.

1 INTRODUCTION

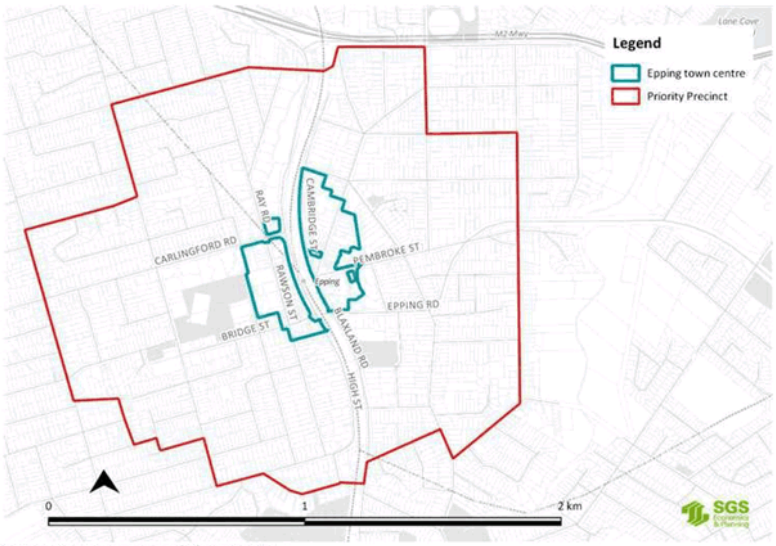
SGS Economics and Planning has been commissioned by City of Parramatta Council to prepare a commercial floorspace study for the Epping town centre. The objective of this project is to identify the level of commercial (retail, office and business) floorspace required to meet current and future demand and any changes that should be made to planning documents to meet this demand.

This project forms part of the Epping Planning Review. The Epping Planning Review follows the incorporation of the whole of the Epping town centre into the City of Parramatta local government area in 2015 (the eastern side was previously in the Hornsby LGA). The Epping Planning Review intends to deliver one set of planning controls for Epping with an integrated infrastructure plan taking into account the needs of residents, workers and visitors.

1.1 Study area

Figure 1 shows the study area/s for this report. For the purposes of this report, the Epping town centre is defined as the land zoned B2 Local Centre around the train station. The wider Epping centre incorporates land within 800 metres of the train station that was included in the Epping Priority Precinct (formerly Urban Activation Precinct). The terms Epping town centre and Epping Priority Precinct are used throughout this report to refer to the areas shown in blue and red outline respectively in Figure 1.

FIGURE 1. EPPING TOWN CENTRE AND PRIORITY PRECINCT



Source: SGS Economics and Planning, 2017

1.2 Scope of work

This report analyses demand for commercial floorspace. Commercial floorspace refers to the sum of retail, office and other non-residential floorspace in the Epping town centre. Demand for social infrastructure, however, is assessed in a separate report.

This report considers the following:

- Review of the local and state planning context for the Epping town centre and wider area
- Analysis of Epping's existing economic profile
- Review of market drivers for office, retail and other commercial floorspace
- Assessment of local market conditions and recent trends impacting on non-residential floorspace in the Epping town centre
- Assessment of demand for retail, office and other commercial floorspace in the Epping town centre to 2036
- Articulate the role and function of the Epping town centre in light of these factors and identify planning mechanisms required to achieve this vision.

1.3 Structure of the report

The remaining chapters of this report are as follows:

Chapter 2: Strategic and policy framework	Outlines the existing planning framework impacting on the Epping town centre, including the Priority Precinct planning process.
Chapter 3: Epping's economic profile	Reviews the current and projected economic profile for Epping as a residential and employment centre.
Chapter 4: Market trends and drivers	Analyses macroeconomic and local trends impacting on office, retail and other commercial uses, including findings from consultation with relevant stakeholders
Chapter 5: Retail demand assessment	Calculates demand for retail floorspace in the Epping town centre and surrounds to 2036.
Chapter 6: Office demand assessment	Calculates demand for office floorspace in the Epping town centre and surrounds to 2036.
Chapter 7: Implications and directions	Outlines the proposed role and function of the Epping town centre and recommends strategies to achieve this vision.

An Appendix has also been included listing recent retail developments in Epping town centre and the local retail market.

2 STRATEGIC AND POLICY FRAMEWORK

2.1 Current planning context

NSW strategies and policies

A Plan for Growing Sydney (2014)

A Plan for Growing Sydney is the primary strategic planning document for metropolitan Sydney, guiding and shaping development of the city to 2031.*A Plan for Growing Sydney* has four goals to deliver new housing and employment across the metropolitan area:

- a competitive economy with world class services and transport;
- a city of housing choice with homes that meet our needs and lifestyles;
- a great place to live with communities that are strong, healthy and well connected; and
- a sustainable and resilient city that protects the natural environment and has a balanced approach to the use of land and resources

A Plan for Growing Sydney identifies the Epping town centre as one of its 10 Priority Precincts. Priority Precincts were chosen based on their alignment with housing, employment and urban renewal strategies, their potential to capitalise on existing infrastructure, their importance to more than one LGA, their environmental, social and economic sustainability, and potential development of the area being consistent with market demand. The *Plan* outlines the intent of the NSW Government to match expected population growth with new infrastructure, schools, recreation facilities and improved public roads and services. Further detail of the planning of the Epping Priority Precinct is included below.

Epping is also identified in the *Plan* as part of the North West Rail Link corridor (now known as Sydney Metro Northwest). The corridor is intended to be a focus for increased housing, economic activity and social infrastructure, and is noted as being important for its accessibility to the Global Economic Corridor.

Towards Our Greater Sydney 2056 and Draft West Central District Plan (2016)

In 2016, the Greater Sydney Commission (GSC) released draft District Plans. These plans sit under *A Plan for Growing Sydney* and provide further detail for planning each of Sydney's six districts. The GSC also released a draft amendment to *A Plan for Growing Sydney* setting out a vision for the metropolitan area to 2056.

One of the crucial concepts and metropolitan priorities of *Towards our Greater Sydney 2056* is the a 30-miunte city. This plan intends to increase the range of jobs and services and other opportunities that people can get to within 30 minutes from their place of residence. A 30-mintue city intends to improve the quality of life of Greater Sydney residents and improve accessibility and transport outcomes across the metropolitan area.

The draft District Plans contain a three-level hierarchy of centres:

- Strategic centres
- District centres
- Local centres

Strategic centres are the most significant centres across Greater Sydney and generally contain at least 20,000 jobs. Strategic centres meet one of the following criteria:

- a higher proportion of knowledge-economy jobs, principally relating to the presence of major hospitals, tertiary education institutions, stand-alone office development or a combination of these
- the presence of existing or proposed major transport gateways
- a major role in supporting the increased economic activity of the Eastern, Central or Western Cities.

Examples of Strategic centres include Greater Parramatta, Sydney Olympic Park and Macquarie Park.

District centres are defined by one of the following characteristics and generally contain between 5,000 and 10,000 jobs:
- the scale of retail activity, generally over 50,000m^2 of floor space
- the presence of health and education facilities that serve the district and the local community
- the level of transport services

Examples of District centres include Hornsby, Castle Hill and Burwood.

Under the *Draft West Central District Plan,* Epping is identified as a local centre. Local centres are defined in the draft District Plans as varying in size from a few shops on a corner to a vibrant main street and generally serving the local population.

The *Draft West Central District Plan* identifies Epping as one of the local centres that will support the Greater Parramatta and Olympic Peninsula (GPOP). The renewal and revitalisation of Epping town centre is identified as one example of the major changes happening in the district that have involved concurrent investment in growth and renewal opportunities. Along with Merrylands, Epping is identified as a local centre 'that, with the right planning and investment, could reach their potential as emerging commercial and retail nodes' (page 48).

The forecast for the town centre under the *Draft Plan* is for up to 3,750 dwellings to be delivered. One of the key actions identified for the Parramatta LGA is also to progress the delivery of urban renewal in the Epping town centre. No employment targets are provided.

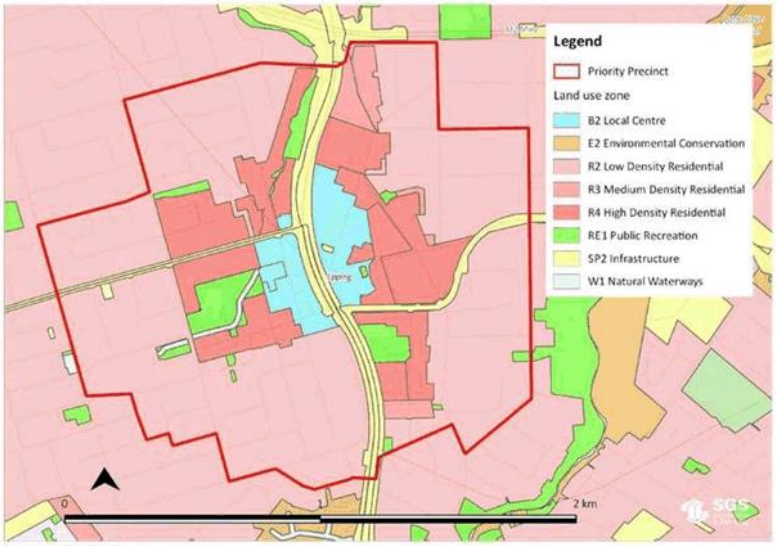
Local planning controls

Current zoning and LEP controls

The current LEP controls contained in the *Parramatta Local Environmental Plan 2011* and the *Hornsby Local Environmental Plan 2013* have resulted from the Priority Precinct planning process and have largely been harmonised across the two environmental planning instruments.

The current zoning for the Epping town centre area is shown in Figure 2, where the B2 Local Centre zoned areas represent the focus for retail and commercial uses in the centre. The B2 Local Centre zone permits the following uses with consent:
- Commercial development (including office, retail and other businesses)
- Residential development in the form of shop top housing, boarding houses or seniors housing
- Tourist and visitor accommodation
- Community facilities
- Services such as child care centres, schools, recreation facilities, medical centres and function centres

FIGURE 2. LAND ZONING, EPPING TOWN CENTRE



Source: SGS, 2017.

The objectives of the B2 zone under the Hornsby LEP 2013 are to:

- Provide a range of retail, business, entertainment and community uses that serve the needs of people who live in, work in and visit the local area,
- Encourage employment opportunities in accessible locations, and
- Maximise public transport patronage and encourage walking and cycling.[1]

In addition to these, the Parramatta LEP 2011 includes the objective for the B2 zone to:

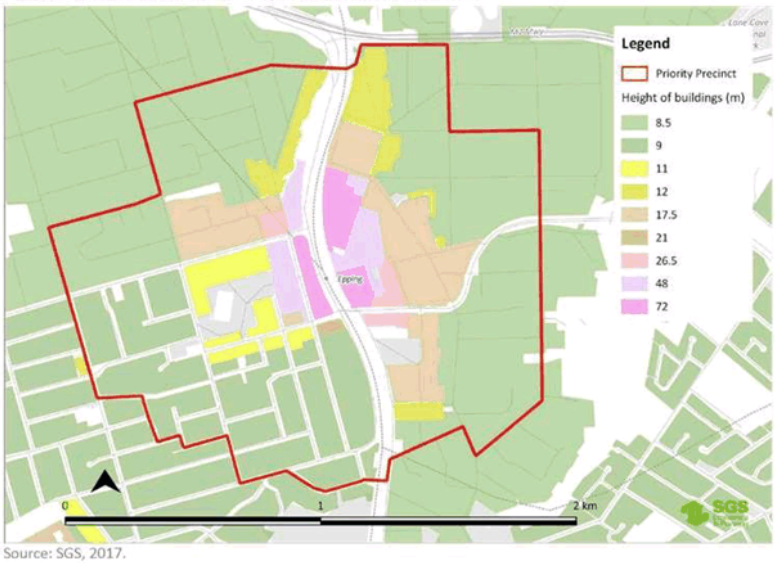
- Encourage the construction of mixed use buildings that integrate suitable commercial, residential and other developments and that provide active ground level uses.[2]

[1] Hornsby Local Environmental Plan 2013, http://www.legislation.nsw.gov.au/#/view/EPI/2013/569/full

[2] Parramatta Local Environmental Plan 2011, http://www.legislation.nsw.gov.au/#/view/EPI/2011/540/full

The current maximum building heights for the town centre core under the LEPs are shown in Figure 3. The B2 zoned areas closest to the rail line and Beecroft Road have a maximum height of 72 metres (approximately 22 storeys). Surrounding B2 Local Centre zoned land has a maximum height of buildings of 48 metres (approximately 15 storeys).

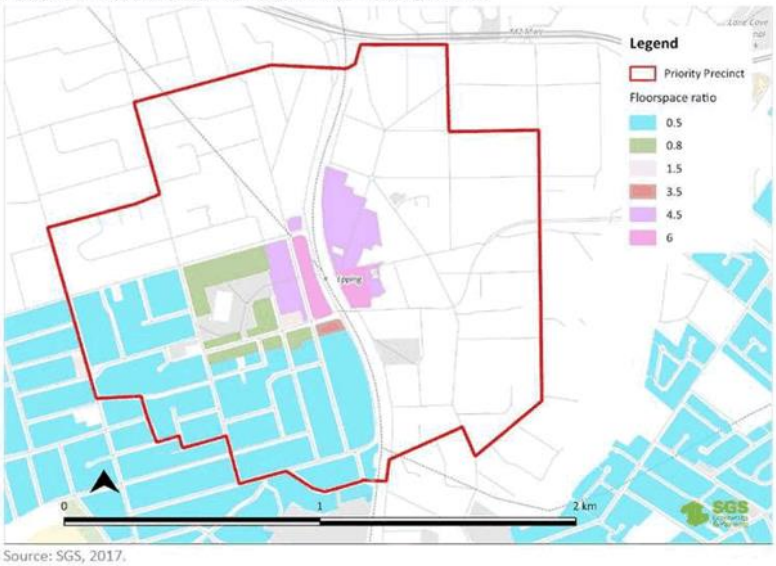
FIGURE 3. BUILDING HEIGHTS, EPPING TOWN CENTRE



Source: SGS, 2017.

Figure 4 shows the current floor space ratios (FSR) in Epping. Two sections close to the railway and Beecroft Road have a FSR of 6:1. These sites have a maximum height of building for 72 metres. The rest of the B2 Local Centre zoned land has a FSR of 4.5:1. Land zoned R4 High Density Residential in the former Hornsby local government area do not have FSR controls. R4 High Density Residential land in the former Parramatta City Council local government area have FSR controls ranging from 0.8:1 to 0.5:1.

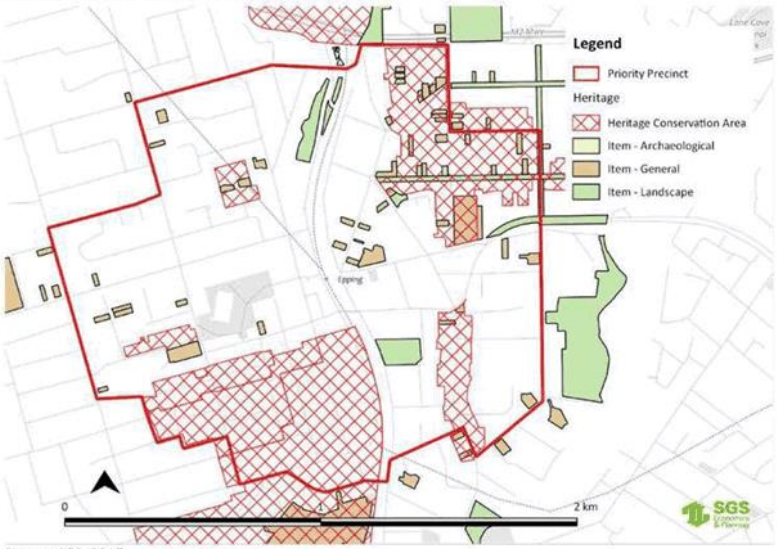
FIGURE 4. FLOOR SPACE RATIO, EPPING TOWN CENTRE



Source: SGS, 2017.

Heritage items identified in the LEPs are shown in Figure 5. There are several local heritage items along Oxford Street, including The School of Arts building, St Albans church, some shopfronts and some houses now used for non-residential purposes. Forest Park to the south of the Epping town centre and bushland to the north are identified as landscape heritage items under the *Hornsby Local Environmental Plan 2013*. The town centre and R4 High Density Residential zoned land are surrounded by heritage conservation areas to the south, east and north. The heritage conservation areas also contain heritage items of local and/or landscape significance.

FIGURE 5. HERITAGE, EPPING TOWN CENTRE



Source: SGS, 2017.

The current library site is subject to additional permitted uses under Schedule 1 of the *Hornsby Local Environmental Plan 2013*. Residential flat buildings are permitted with consent provided that the consent authority is satisfied that the ground floor uses of the building would be used only for the purposes of a community facility.

DCP controls

The *Parramatta Development Control Plan 2011* and *Hornsby Development Control Plan 2013* identify Epping as a commercial town centre providing services to a wide local catchment. The two DCPs identify the following common elements in the desired future character for Epping:

- Compact, walkable and vibrant urban centre
- Mix of residential, commercial and retail uses
- Main street, fine grain retail development with high quality public domain. New development is expected to contribute positively to the public domain.
- Preservation and enhancement of local heritage items and character
- High quality built form, especially concerning high density development forms.

The *Parramatta Development Control Plan 2011* emphasises the need for high quality, slim-line towers fronting Rawson Street and Beecroft Road, with existing heights and densities in Boronia Park to remain and act as a buffer between high and low density areas. The human scale is also a significant consideration, with appropriate setbacks to avoid dominating the street, and improving pedestrian connections across the Epping town centre either side of the rail line.

The *Hornsby Development Control Plan 2013* also emphasises the activation of ground floor uses with specific controls regarding the use of outdoor dining and use of the footpath for retail uses and maintenance of a main street retail urban form.

Both DCPs contain detailed controls for setbacks (both at street level and raised podiums), locations for active street frontages, open spaces (both private and public), landscaping and street frontage widths.

The *Parramatta Development Control Plan 2011* specifically encourages the amalgamation of lots to ensure orderly development and identified existing and planned pedestrian connection networks through the town centre.

Both the *Parramatta Development Control Plan 2011* and *Hornsby Development Control Plan 2013* contain development controls requiring a 2 to 3 storey podium element for development in the B2 Local Centre zone with a tower development above the podium. This podium control aims to deliver a human-scale development as well as provide space for non-residential floorspace within the first 2 to 3 storeys of the development.

The two DCPs contain different parking requirements for new development in the Epping town centre. Table 1 outlines the parking requirements as per the *Parramatta Development Control Plan 2011* and *Hornsby Development Control Plan 2013.*

The *Parramatta Development Control Plan 2011* requires parking to be provided in basements on B2 Local Centre and R4 High Density Residential zoned land. The *Hornsby Development Control Plan 2013* requires resident and visitor parking to be located underground and encourages at grade parking for shoppers.

TABLE 1. CURRENT PARKING REQUIREMENTS IN EPPING

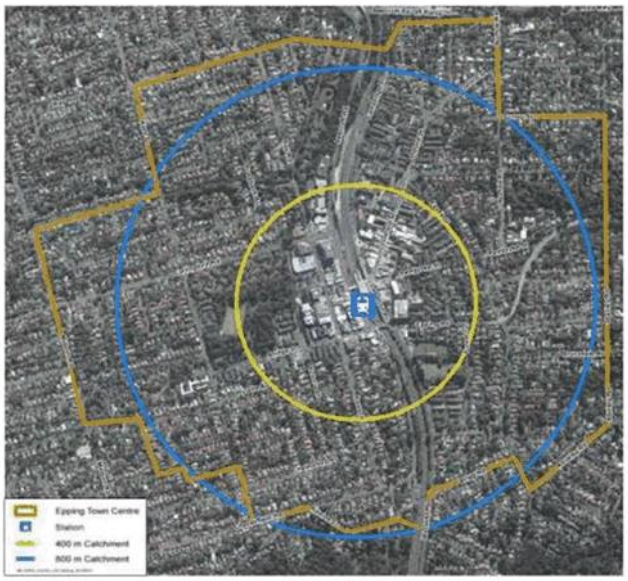
Category	*Parramatta Development Control Plan 2011*	*Hornsby Development Control Plan 2013*
Residential (per dwelling)	0.5 spaces – Studio 0.75 spaces – 1 bedroom 1 space – 2 bedrooms 1.5 spaces – 3 or more bedrooms 1 space for every 10 dwellings for visitors 1 space for every 50 dwelling for car share	0.75 spaces – 0-1 bedroom 1 space – 2 bedrooms 1.5 spaces – 3 or more bedrooms 1 space for every 7 dwellings for visitors
Retail and hospitality	Minimum of 1 space per 60m² of gross floor area, maximum of 1 space per 30m² of gross floor area	1 space per 29m² of gross lettable floor area
Commercial	Minimum of 1 space per 70m² of gross floor area, maximum of 1 space per 50m² of gross floor area	1 space per 48m² of gross floor area
Medical uses	Minimum of 1 space per 70m² of gross floor area, maximum of 1 space per 50m² of gross floor area	3 per surgery – health consulting rooms 4 per surgery – medical centres
Bulky goods premises	Minimum of 1 space per 60m² of gross floor area, maximum of 1 space per 30m² of gross floor area	1 space per 75m² of gross lettable floor area

Source: *Parramatta Development Control Plan 2011, Hornsby Development Control Plan 2013*
Note: Parking rates under the *Hornsby Development Control Plan 2013* shown are for development within 800m of the train station. Higher rates apply further from the train station.

Epping UAP/Priority Precinct Process

As noted above, Epping has been identified as one of 10 Priority Precincts (formally Urban Activation Precincts) by the NSW Government. The Epping town centre was identified as an Urban Activation Precinct in 2012 by then Department of Planning and Infrastructure (now Department of Planning and Environment (DPE)). The Epping town centre Urban Activation Precinct boundary is shown in Figure 6.

FIGURE 6. EPPING TOWN CENTRE URBAN ACTIVATION PRECINCT



Source: NSW Department of Planning & Infrastructure, 2013.

Background studies

The *Epping town centre Study* was completed in 2011. The purpose of this study was to enable Epping to fulfil its role as a town centre in the Sydney metropolitan context and to maximise the benefits arising from State Government infrastructure investment.

At the time of the study, Epping supported around 12,900 square metres of retail floorspace, and around 55,000 square metres of commercial office floorspace, as well as schools and other community facilities. It was identified that with the planning controls of the time, there was limited potential for increased development in the catchment area, but that there were few environmental constraints that would limit greater residential intensification.

The study identified that most office developments in the Epping town centre were concentrated in three precincts in larger floorplate developments. These three precincts were largely located on the edges of the centre. The Study noted that while there was a larger amount of office space than would typically be provided in a town centre, Epping would be unlikely to compete and be able to attract significant additional employment growth because of its proximity to larger and well-established employment centres.,.

The study also argued that demand for larger, higher grade floorplates would result in reduced demand for the type of space on offer in Epping, and that larger commercial sites in the centre would provide redevelopment opportunities, particularly for housing and retail uses.

The study also noted that retail uses were concentrated along Rawson Street, Oxford Street, Beecroft Road, Bridge Street and Langston Place, with the western side of the railway line accommodating the

majority (85%) of retail floorspace. A number of issues for the area in terms of its retail market were identified, including traffic congestion limiting both vehicular and pedestrian access, and trade being lost to surrounding centres.

Planning the Priority Precinct

As part of the process of rezoning the Epping town centre, a number of key issues were raised with the DPE. These include height and density controls, public space, traffic, heritage items and conservation areas, and the additional services such as schools that would be required. The *Finalisation Report* outlines the changes to the planning controls, which primarily included:

- Mixed use commercial and residential buildings in the core area within 400 metres of the railway station, permitting building up to 22 metres high and FSR's up to 6:1,
- The introduction of 5 residential intensification precincts within the wider town centre precinct, allowing for buildings up to 5 storeys, and
- The introduction of new and expanded heritage conservation areas, applicable to 30% of the precinct.

Changes to the proposal between the *Planning Report* and the *Finalisation Report* increased the estimated dwelling yield within the precinct from 3,600 to 3,750. Development of the Epping town centre under these controls was found to be feasible, including with increased Section 94A contributions to fund local infrastructure improvements, reflecting the strength of the residential market.

A key concern that was raised in the planning process was that the rezoning would reduce the amount of commercial floorspace in the precinct, and thus reduce employment opportunities. However, it was recommended that no changes be made to the proposed B2 areas, and that market demand would dictate the volume of commercial and other uses within the town centre. It was noted that there would likely be less demand for larger floor plate uses in Epping due to the popularity of nearby centres such as Macquarie Park and Norwest Business Park, but that there would still be demand for smaller commercial premises.

A feasibility study prepared as part of the finalisation of the UAP envisaged a strong retail focus of the Epping town centre servicing the local residential and employee population. The feasibility report suggested that there would be significant opportunities for retailers including cafés and restaurants to be included as part of future developments given the area's expected population growth. The development of commercial office floorspace is not included in the assessment.

The council-owned car park adjacent to Boronia Park was subject to specific masterplanning as part of the Priority Precinct planning process. Sites adjacent to the carpark, including the supermarket and office building, were included in this masterplanning process in consultation with these land owners. While in general the new planning controls introduced through the Priority Precinct planning process would allow for feasible development, it was also suggested that on the Council site, towers well-exceeding the allowable heights would be needed for any development to remain feasible and deliver on open space requirements. The masterplanners recommended that greater FSR's or building heights only be permitted where significant public benefits are provided, such as in public domain improvements.

Vision for Epping as a Priority Precinct

The vision for the Epping Priority Precinct contained in the planning reports prepared by DPE is for a revitalised precinct, accommodating 3,750 new homes within a 10 minute walk of existing public transport, employment and local services. This vision includes:

- A compact high density town centre core, where the majority of new dwellings are within the core, tall buildings are setback from streets, and where a range of retail and commercial activities occur at lower levels and service the local population,
- Increased residential densities adjoining the town centre, to allow for apartment buildings of 2-6 storeys in new residential areas, and for the retention of existing high, medium and low density areas,
- Heritage conservation areas and items to not be subject to increased dwelling densities,
- A revitalised public domain to create a lively centre, with improvements and the establishment of new public spaces in specific streets, and

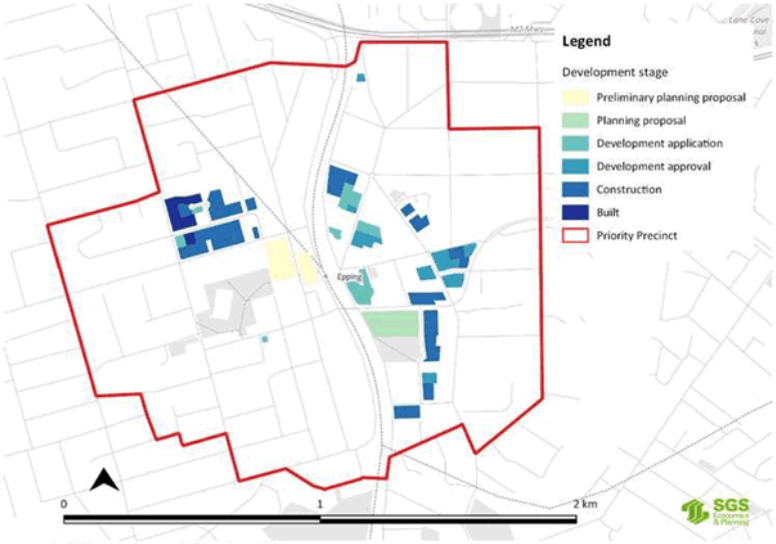
– Improved connections, especially for pedestrians and cyclists.

Recent development and proposals

The redevelopment opportunities identified in the 2011 *Epping Town Centre Study* have started to occur, with the commercial precincts to the north of the town centres currently being redeveloped for residential purposes.

Development to date has been concentrated around Cliff Road on the western side of the precinct, and around Forest Grove, Epping Road, and Pembroke Street in the south-east. The location of planning proposals and development applications in Epping town centre and their stage of development is shown in Figure 7.

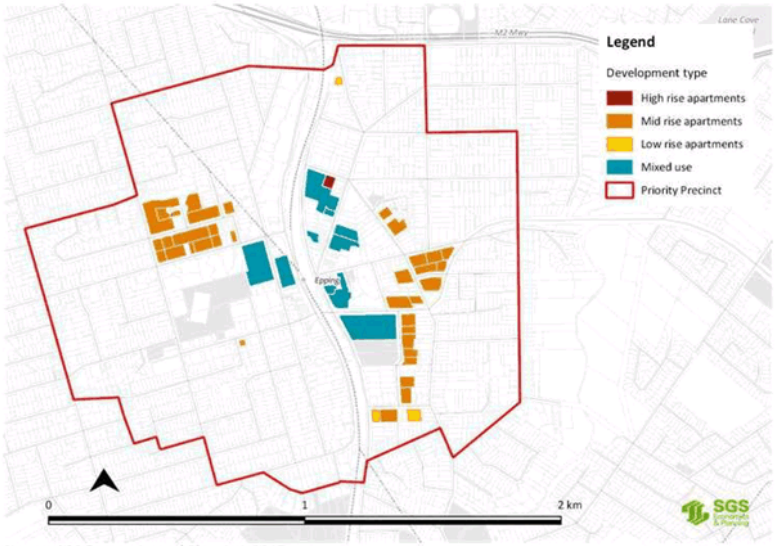
FIGURE 7. DEVELOPMENT ACTIVITY IN THE EPPING TOWN CENTRE



Source: SGS Economics and Planning, 2017

Following the designation of Epping as a Priority Precinct and the subsequent rezoning to concentrate growth around the railway station, much of the development activity and development in the pipeline is for high density residential uses and mixed use buildings with ground floor commercial uses and residential development from the second storey up. This differs from the DCP controls requiring the first 2 to 3 storeys for non-residential floorspace. Figure 8 below shows the location and type of development included in recent development applications.

FIGURE 8. DEVELOPMENT TYPE IN THE EPPING TOWN CENTRE



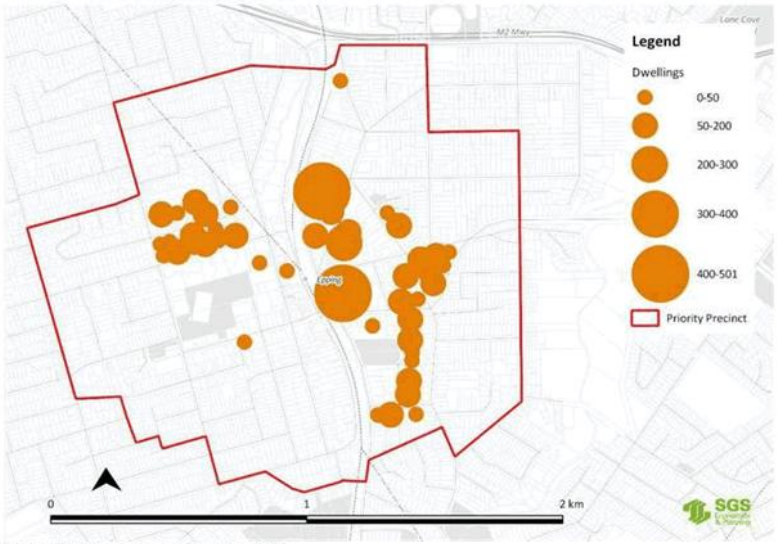
Source: SGS Economics and Planning, 2017
Note: Low rise includes residential development up to 3 storeys, mi rise includes development between 4 and 7 storeys, high rise includes 8 storeys and higher.

The Epping Priority Precinct is forecast to have the potential for 5,530 dwellings by 2036. This is 1,780 dwellings above the final vision for the Priority Precinct of 3,750 dwellings published in 2014. In the period to December 2016, there were 43 development applications lodged, including a total of 3,855 apartments. A total of 39 of these have been approved, including 3,157 apartments. The approved dwellings at the time of writing represent approximately 57% of all dwelling potential for the Epping Priority Precinct.

Of the developments approved or under construction, the number of dwellings has ranged from 12 up to 464. At the time of writing, City of Parramatta Council is considering a pre-lodgement development application containing 501 dwellings in the Epping town centre.

Figure 9 below shows the location of approved new dwellings in the Epping Priority Precinct. Clusters of residential development are evident in areas zoned R4 High Density Residential around the town centre and on the eastern side of the Epping town centre.

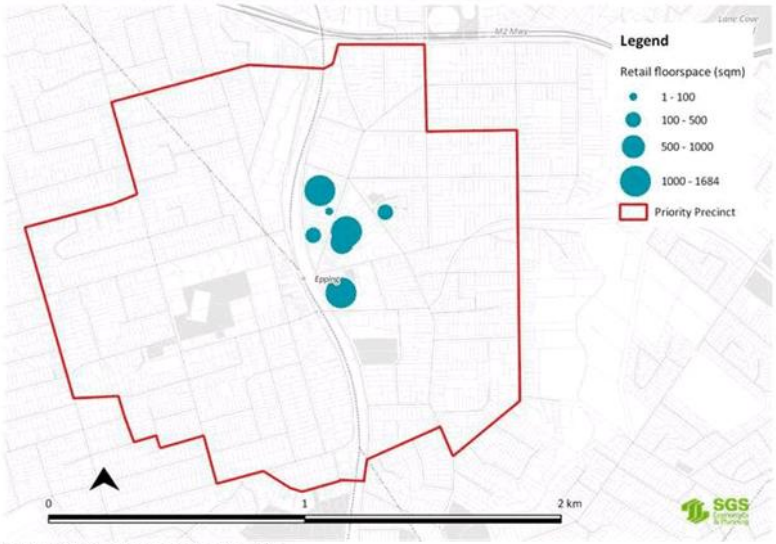
FIGURE 9. DWELLING NUMBERS IN RECENT DEVELOPMENT APPLICATIONS IN THE EPPING TOWN CENTRE



Source: SGS Economics and Planning, 2017

Recent development applications in the Epping town centre contain limited floorspace for retail and/commercial uses. Figure 10 below shows the location and square metres of retail and/or commercial floorspace included in recent development applications. This floorspace is included on the ground floor or upper ground floor of developments on sloping sites. Retail floorspace proposed in recent development applications is solely located on the eastern side of the Epping town centre.

FIGURE 10. RETAIL AND/OR COMMERCIAL FLOORSPACE IN RECENT DEVELOPMENT APPLICATIONS IN THE EPPING TOWN CENTRE



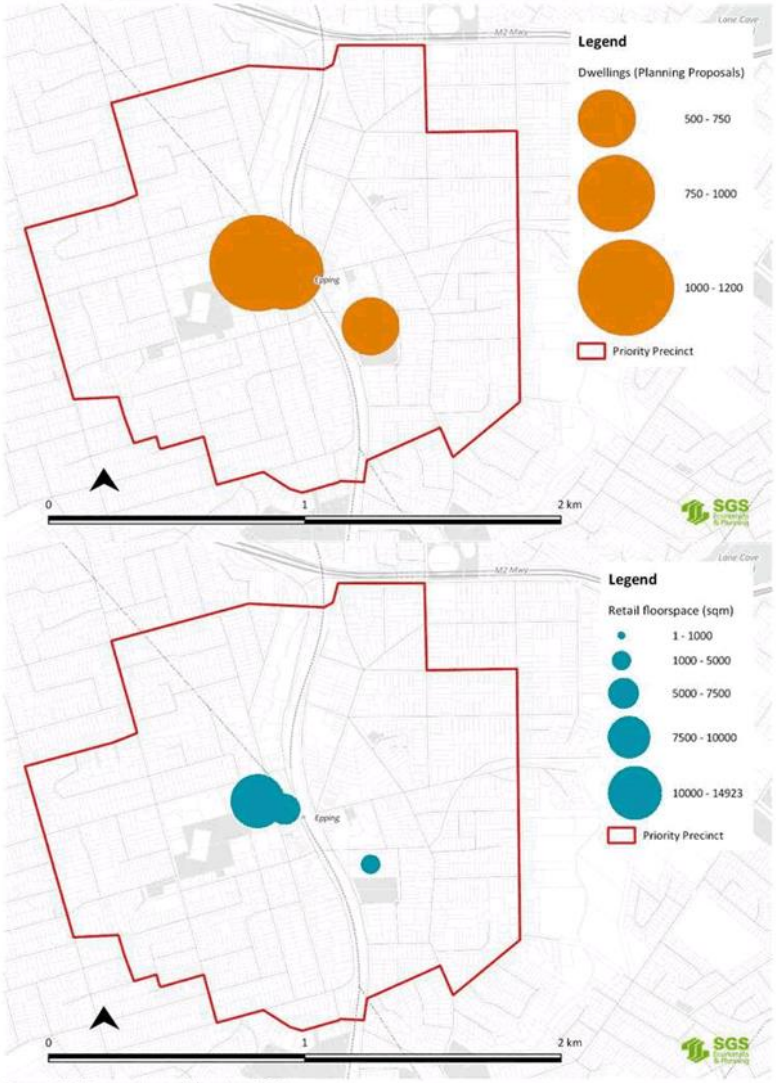
Source: SGS Economics and Planning, 2017

Recent planning proposals received by City of Parramatta Council (both preliminary and formal applications) seek to increase the height of buildings and floorspace ratios applicable to different sites in the Epping town centre. In one case, the planning proposal also seeks to change the zone of the affected lots from B2 Local Centre to B4 Mixed Use.

Due to the nature of planning proposals, the exact specifications of the future land uses are not known. Figure 11 below provide an indication of the capacity for residential floorspace (by dwellings) and retail/commercial floorspace (by square metres) respectively. The proposed height of buildings and floorspace ratios are significantly higher than what is permissible under the current planning controls and, as such, the dwelling capacity proposed is significantly higher than the current development applications.

Recent planning proposals largely discuss shop top housing as the likely land use on the subject sites. The quantum of dwellings and commercial floorspace is taken from the planning proposal documents.

FIGURE 11. DWELLING NUMBER AND RETAIL FLOORSPACE CAPACITY IN CURRENT PLANNING PROPOSALS IN THE EPPING TOWN CENTRE



Source: SGS Economics and Planning, 2017

2.2 Summary

Review of the current LEPs and DCPs applicable to the Epping town centre suggests that local government plans for the area define it as an important commercial and retail centre, providing local employment opportunities. State level policy around Epping, particularly its designation as a Priority Precinct, is more focused on the town centre accommodating high density residential development with some mixed use functions rather than maintaining Epping's historic office employment function.

Epping's proximity to key destinations and employment locations via rail, such as Macquarie Park, North Sydney and the Sydney CBD, is a strong strategic advantage for the town centre, particularly with the establishment of the Metro Northwest link. However, while Epping's transport accessibility is rated highly, it has declined as a commercial office given newer and larger centres nearby (including Parramatta and Macquarie Park). Planning controls in these centres typically include zones which prohibit residential development and these have supported the growth of office employment. Epping in contrast has mixed use zones which allow residential and has therefore transitioned away from its previous role as a commercial office location.

Analysis of recent development in and around the town centre shows that the vast majority of planning proposals and development applications are focused on establishing high density residential dwellings, with in some cases commercial and retail included on the ground floor as part of mixed use buildings. A number of these proposals have also sought to develop sites above the building height and FSR limits introduced under the Priority Precinct planning process outlined in both the Parramatta and Hornsby LEPs.

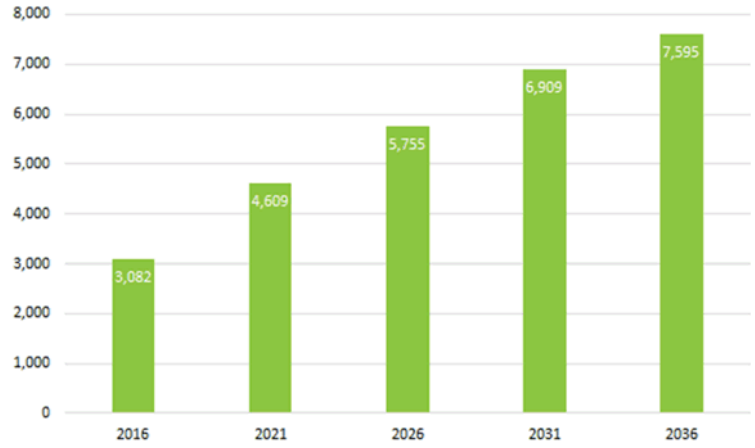
This trend, along with policies at the State level which are focused on providing more housing, is likely to have implications for the provision of floorspace in the Epping town centre in future. If current development trends continue, Epping town centre is likely to continue to lose its commercial floorspace, to residential floorspace in mixed use developments. However, retail floorspace is likely to remain constant as mixed use developments with ground floor retail replace existing shop fronts.

3 EPPING'S ECONOMIC PROFILE

3.1 Socioeconomic factors

The Epping town centre's population is forecast to more than double between 2016 and 2036. The town centre is forecast to increase at a compounded annual growth rate of 4.61% to grow to 7,595 residents by 2036. The forecast population growth of the Epping town centre is shown in Figure 12[3].

FIGURE 12. FORECAST POPULATION GROWTH



Source: SGS, 2017, using TPA, 2016

Forecast population by age and sex is shown below in Figure 13. At 2016, Epping has significant proportions of young adults aged between 20 and 34. These age groups dominate the Epping town centre's population mix.

While significant increases are forecast for the elderly population (i.e. those aged 75 years and over) and children at 2036, the age of residents remains skewed towards a young adult population. This reflects the nature of development proposed in the Epping town centre outlined in Chapter 2 and the proximity of Epping to employment and higher education facilities.

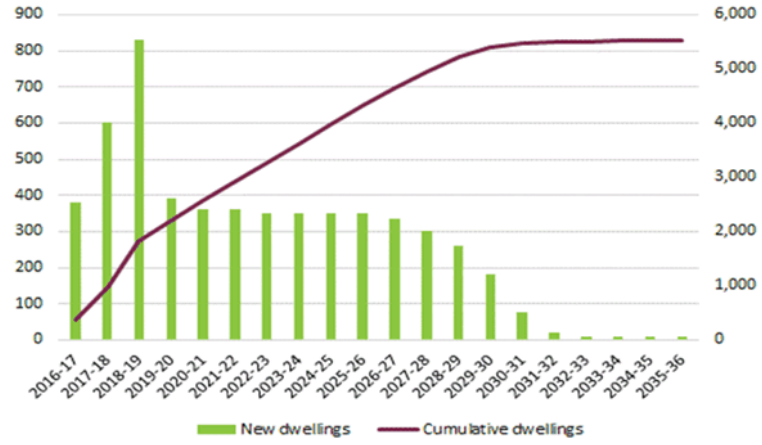
[3] It is noted that City of Parramatta Council has prepared an analysis of projected population in the Epping town centre based on development application data. This differs from the population projection used in this report, which have been prepared by NSW Transport Performance and Analytics for land use forecasts across Greater Sydney. The methodologies differ between the two forecasts.

FIGURE 13. FORECAST POPULATION GROWTH BY AGE AND SEX

Source: SGS, 2017, using TPA, 2016

Figure 14 below shows the dwellings by year to 2036 forecasted by the Department of Planning and Environment. The Epping Priority Precinct is forecast to include an additional 5,530 dwellings between 2016 and 2036. The majority of these new dwellings are forecast to be developed in the next 6 years, with an additional 2,920 dwellings forecast between 2016/17 to 2021/22. There is potential for these additional dwellings to be developed earlier than forecast in light of recent development application activity in the Epping town centre.

FIGURE 14. FORECAST NEW DWELLINGS



Source: SGS, 2017, using DPE, 2016

The participation rate of the resident workforce is shown below in Table 2. The current labour participation rate of residents of the Epping town centre (72.11%) is currently above average for the City of Parramatta local government area (70.16%) and comparable to labour participation across Greater Sydney (72.27%). The proportion of residents engaged in the workforce is forecast to increase between 2016 to 2036, from 72.11% to 76.48%.

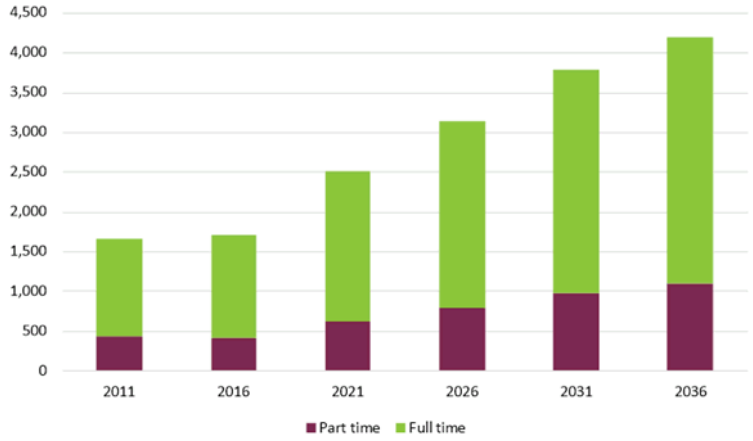
TABLE 2. LABOUR PARTICPATION RATE OF THE RESIDENT WORKFORCE

	2016	2036
Epping town centre	1,706	4,201
Labour force participation rate	72.11%	76.48%

Source: SGS, 2017

The split between part time and full time work of Epping town centre residents is forecast to remain constant in the twenty years between 2016 and 2036, as shown in Figure 15. Full time work is forecast to remain the dominant means of employment, accounting for approximately 74% of the resident workforce. Part time work accounts for approximately 26% of employment among the resident workforce of the Epping town centre.

FIGURE 15. RESIDENT WORKFORCE – PART TIME AND FULL TIME WORK



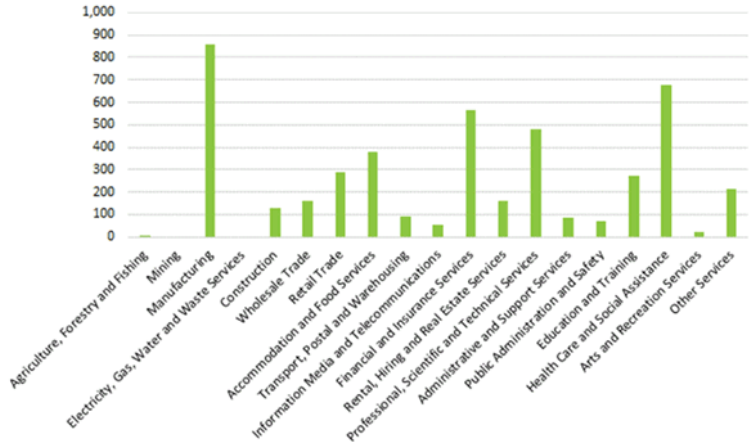
Source: SGS, 2017

3.2 Industry and employment analysis

At the 2011 Census, there were 4,512 jobs in the Epping town centre and a total of 5,550 jobs in the Epping Priority Precinct. Employment in the Epping town centre is shown below in Figure 16.

The majority of these jobs were in Manufacturing, Financial and Insurance Services and Health care and Social Assistance industries. These reflect the significant employers located in Epping at the time of the 2011 Census, such as Unilever (food manufacturing) and Westpac (banking).

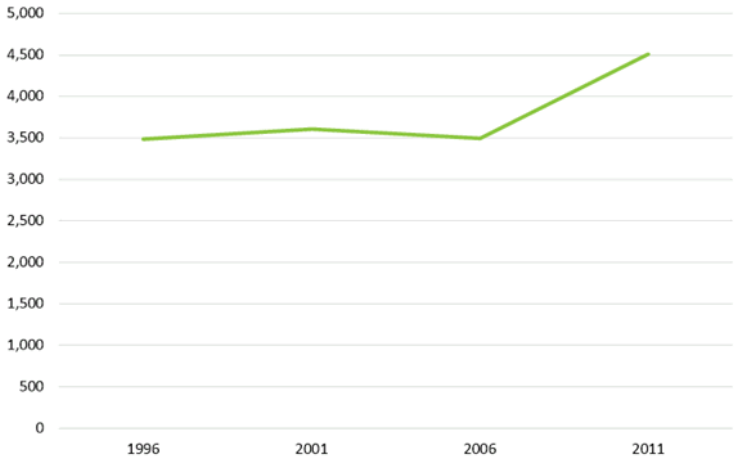
FIGURE 16. EMPLOYMENT BY INDUSTRY IN EPPING TOWN CENTRE



Source: SGS, 2017 using ABS, 2011

Employment in Epping has remained relatively stable in the Epping town centre in the 15 years from 1996 to 2011. Total employment grew from approximately 3,488 to 4,512. Peak employment in recent years was in 2011, when employment grew by 1,021 jobs from 2006.

FIGURE 17. PAST EMPLOYMENT NUMBERS IN THE EPPING TOWN CENTRE



Source: SGS, 2017 using ABS, 2011

The Greater Sydney Commission has established a simplified categorisation of employment in the draft District Plans. These categories provide an indication of where different industries and use locate and cluster across Greater Sydney. These categories are defined in Table 3.

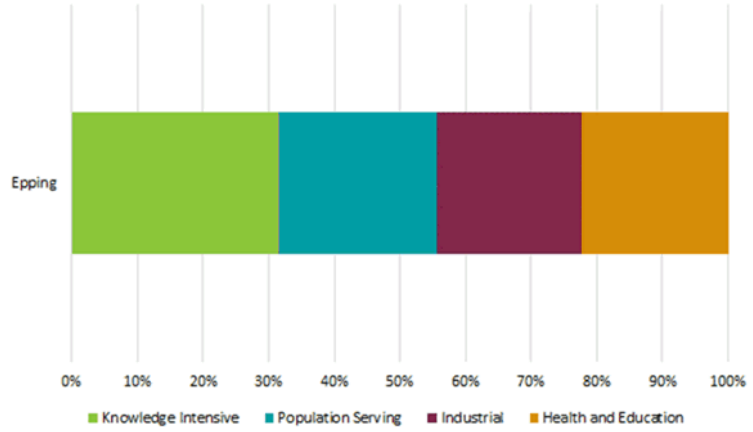
TABLE 3. GSC JOB CLASSIFICATION

Category	ABS Industry Classification (ANZSIC 2006)	Examples
Knowledge Intensive	Information Media and Telecommunications Financial and Insurance Services, Rental, Hiring and Real Estate Services Professional, Scientific and Technical Services Administrative and Support Services Public Administration and Safety Advanced Manufacturing	Major finance and consulting firms, research institutions, government departments and agencies, property and real estate firms, innovation hubs, HR and recruitment firms
Population Serving	Retail Trade Accommodation and Food Services Arts and Recreation Services Construction Other Services	Shops, cafes, restaurants, hotels, art galleries and museums, gyms, sporting facilities, building and construction
Industrial	Agriculture, Forestry and Fishing Mining Manufacturing Electricity Gas, Water and Waste Services Wholesale Trade Transport Postal and Warehousing	Warehouses, logistics, factories, energy plants, peri-urban
Health and Education	Education Health Care and Social Assistance	Universities, hospitals, medical research, schools, medical clinics

Source: GSC, 2016

Epping has a relatively even mix of employment against the four Job Classification categories established by the Greater Sydney Commission in the draft District Plans. Approximately 32.0% of all jobs in Epping fall within the Knowledge Intensive category. The split between Population Serving, Industrial and Health and Education jobs are relatively even, representing 24.1%, 22.0% and 22.4% of all jobs respectively. The breakdown of jobs in Epping is shown in Figure 18.

FIGURE 18. BREAKDOWN OF EMPLOYMENT BY GSC CATEGORIES

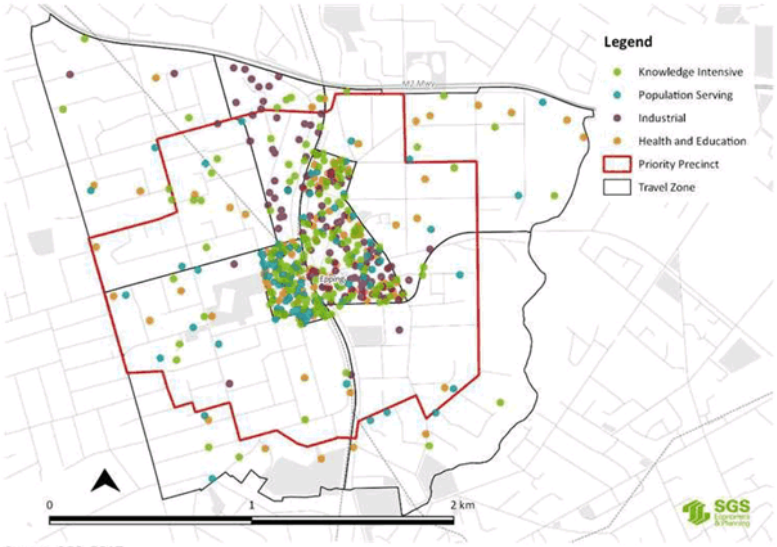


Source: SGS, 2017

The distribution of jobs in Epping by Travel Zone is shown in Figure 19. It must be noted that the dots are randomly allocated within the Travel Zone and do not reflect actual individual job locations. One dot represents 10 jobs as recorded at the 2011 Census.

The majority of jobs in the Epping Priority Precinct are clustered around the Epping town centre at the train station on B2 Local Centre zoned land. This is especially true for Knowledge Intensive and health and Education jobs, which have clustered on both sides of the train station. A cluster of Population Serving jobs is more pronounced on the western side of the station. Conversely, Industrial jobs have largely clustered on the eastern side of the station, presumably within the office park development along Cambridge and Oxford Streets, and to the north of the town centre.

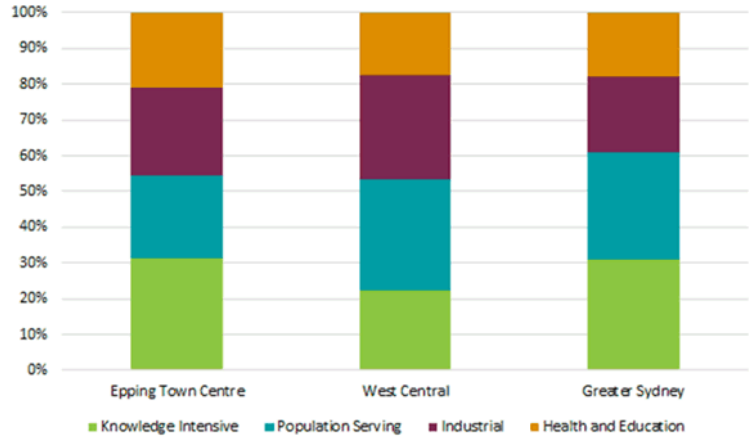
FIGURE 19. INDICATIVE EMPLOYMENT DISTRIBUTION BY TRAVEL ZONE



Source: SGS, 2017
Note: 1 dot = 10 jobs. Dots reflect every 10 jobs in the class within that Travel Zone. Dots are randomly allocated within the Travel Zone and do not reflect actual individual job locations.

A comparison of jobs by GSC job category to the West Central District and Greater Sydney is shown in Figure 20. The Epping town centre has a similar proportion of knowledge intensive jobs to Greater Sydney and a higher proportion compared to the West Central District. Conversely, the Epping town centre's proportion of population serving jobs is lower than the West Central District and Greater Sydney. Epping also has a higher proportion of Health and Education employment. The split of jobs in the Epping town centre indicates that Epping is an accessible location, attracting jobs in industries that do not rely on local populations, such as knowledge intensive jobs in professional services.

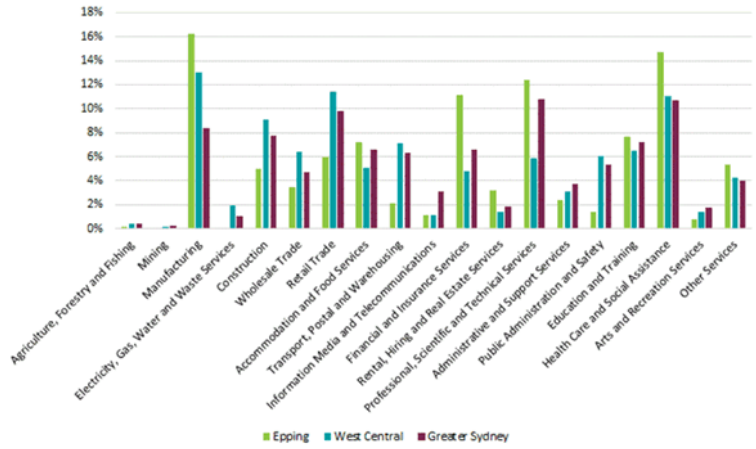
FIGURE 20. BREAKDOWN OF EMPLOYMENT BY GSC CATEGORIES ACROSS THE WEST CENTRAL DISTRICT AND GREATER SYDNEY



Source: SGS, 2017

A comparison of employment by industry with the West Central District and Greater Sydney is shown in Figure 21. Compared to these regions, the Epping town centre has a greater proportion of employment in Manufacturing, Health Care and Social Assistance, Professional, Scientific and Technical Services, Financial and Insurance Services, Rental, Hiring, and Real Estate Services, Other Services, Retail and Education and Training.

FIGURE 21. EMPLOYMENT BY INDUSTRY IN EPPING, WEST CENTRAL AND GREATER SYDNEY



Source: SGS, 2017

Further insights to the strategic clustering of industries in Epping can be gained by categorising the employment sectors by their location quotient (LQ). The LQ is given by the proportional representation of the sector in the Epping town centre versus the proportional representation of the sector in the West Central District and Greater Sydney. An LQ of greater than 1.0 signifies that Epping has a specialisation and competitive advantage in the sector, as it has a greater than average representation of economic activity in the area in question.

Table 4 below shows the LQ for the Epping town centre against the West Central District. Table 4 shows the LQ for industries defined by the ABS and the four GSC employment categories. As noted above, Epping town centre has industry specialisation in Knowledge Intensive and Health and Education employment relative to the West Central District and Greater Sydney. The Epping town centre also records an industry specialisation in Industrial employment relative to Greater Sydney.

When considering the broader range of industries defined by the ABS, industry specialisation in Epping is evident in the following when compared to both the West Central District and Greater Sydney:

- Manufacturing
- Rental, Hiring and Real Estate Services
- Financial and Insurance Services
- Health Care and Social Assistance
- Other Services
- Professional, Scientific and Technical Services
- Accommodation and Food Services

The greatest level of industry specialisation is evident in Manufacturing, Rental, Hiring and Real Estate Services and Financial and Insurance Services, where employment in these industries in the Epping town centre is double the proportion of all jobs recorded in the West Central District. Conversely, the Epping town centre has a significantly lower proportion of jobs in Retail Trade, with retail trade only making up approximately 6% of all jobs in the Epping town centre compared to 11% of jobs in the West Central District and 10% of jobs across Greater Sydney.

TABLE 4. LOCATION QUOTIENT

	Share of employment			Location Quotient	
	Epping	West Central	Greater Sydney	West Central	Greater Sydney
ABS Industry Categories					
Agriculture, Forestry and Fishing	0.08%	0.41%	0.40%	0.18	0.19
Mining	0.00%	0.09%	0.25%	0.00	0.00
Manufacturing	16.27%	13.04%	8.38%	1.25	1.94
Electricity, Gas, Water and Waste Services	0.00%	1.96%	1.04%	0.00	0.00
Construction	4.92%	9.12%	7.73%	0.54	0.64
Wholesale Trade	3.46%	6.37%	4.70%	0.54	0.74
Retail Trade	5.95%	11.39%	9.76%	0.52	0.61
Accommodation and Food Services	7.17%	5.02%	6.56%	1.43	1.09
Transport, Postal and Warehousing	2.10%	7.14%	6.30%	0.29	0.33
Information Media and Telecommunications	1.13%	1.09%	3.08%	1.04	0.37
Financial and Insurance Services	11.11%	4.81%	6.54%	2.31	1.70
Rental, Hiring and Real Estate Services	3.19%	1.38%	1.80%	2.30	1.77
Professional, Scientific and Technical Services	12.36%	5.86%	10.74%	2.11	1.15
Administrative and Support Services	2.37%	3.09%	3.74%	0.77	0.63
Public Administration and Safety	1.41%	6.02%	5.29%	0.23	0.27
Education and Training	7.68%	6.51%	7.22%	1.18	1.06
Health Care and Social Assistance	14.75%	11.09%	10.70%	1.33	1.38
Arts and Recreation Services	0.72%	1.36%	1.79%	0.53	0.40
Other Services	5.33%	4.25%	3.98%	1.25	1.34
GSC Industry Categories					
Knowledge Intensive	31.42%	22.24%	31.19%	1.41	1.01
Population Serving	22.91%	31.14%	29.82%	0.74	0.77
Industrial	24.63%	29.03%	21.07%	0.85	1.17
Health and Education	21.04%	17.59%	17.92%	1.20	1.17

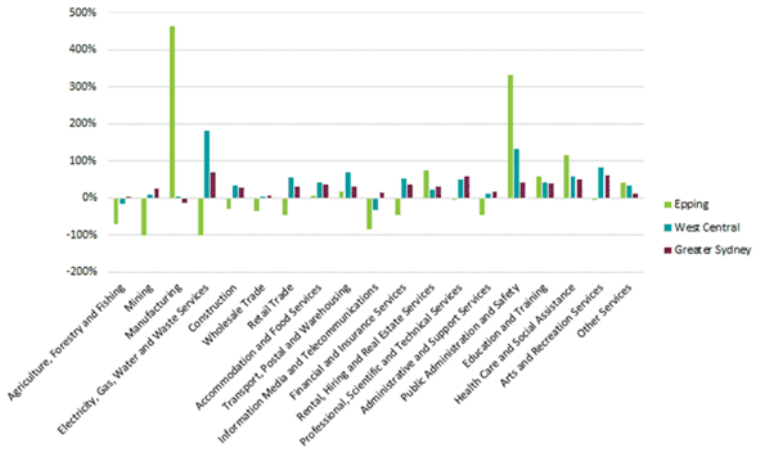
Source: SGS, 2017

Growth in employment by industry between 1996 and 2011 is shown in Figure 22. Over this period, the greatest industry growth for Epping has been seen in Manufacturing, Public Administration and Safety and Health Care and Social Assistance. Over this fifteen year period, these industries at least doubled employment numbers in the Epping town centre and have grown more rapidly in the centre than in either the West Central District or Greater Sydney. Employment growth outpacing the West Central District and Greater Sydney was also evident in Rental, Hiring and Real Estate Services and Other Services.

Declines in employment have been observed in the following industries in the Epping town centre:
- Electricity, Gas Water and Waste Services
- Mining
- Information media and Telecommunications
- Agriculture, Forestry and Fishing
- Administrative and Support Services
- Financial and Insurance Services
- Retail Trade
- Wholesale Trade

- Construction
- Arts and Recreation
- Professional, Scientific and Technical Services.

FIGURE 22. CHANGE IN EMPLOYMENT, 1996-2011

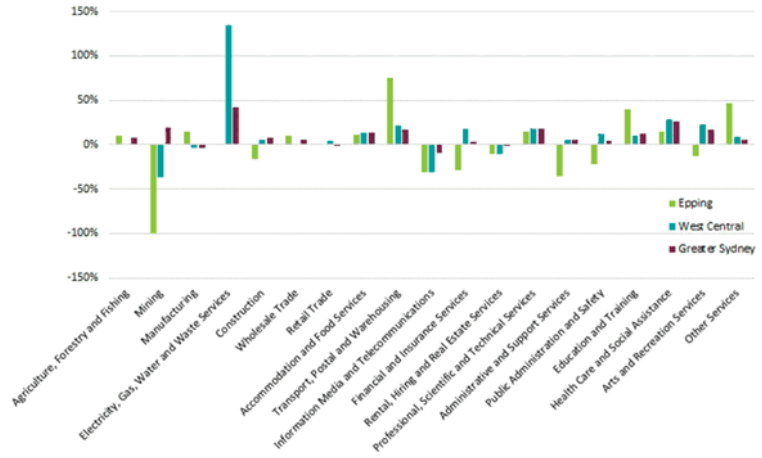


Source: SGS, 2017

In the five years between 2006 and 2011, the Epping town centre gained approximately 1,000 jobs. Figure 23 illustrates the trends in employment by industry in Epping against the West Central District and Greater Sydney over this period. In all industries where Epping experienced jobs growth, increases are also evident in the West Central District and Greater Sydney, except for manufacturing which grew by 14.2% despite an overall decrease in employment in the district and Greater Sydney. Jobs in the Manufacturing industry in the Epping town centre have located in office floorspace and likely incorporate administrative and business services jobs to support industrial jobs. This is different to the majority of Manufacturing jobs across Greater Sydney, which are accommodated in industrial precincts and have declined as Australia moves towards a service economy.

Conversely, the decline in Financial and Insurance Services employment in the Epping town centre was not evident in the district or Greater Sydney, where employment in this industry grew. A decline in employment in Information Media and Telecommunications and Rental, Hiring and Real Estate Services industries was evident across the Epping town centre, West Central District and Greater Sydney.

FIGURE 23. CHANGE IN EMPLOYMENT, 2006-2011



Source: SGS, 2017

3.3 Recent trends and employment forecasts

There have been some significant changes in the commercial landscape of Epping since the 2011 Census. The declaration of Epping as Priority Precinct has seen a significant uplift in development potential in and around the town centre. Some significant employers have relocated out of the Epping town centre as other employment centres have grown.

Analysis of commercial floorplates in 2011 and in 2017 indicates that approximate 25,000 square metres of commercial floorspace has been demolished in Epping, leaving approximately 30,000 square metres of office floorspace. Simultaneously, there are several properties which contain stand alone office developments that have high vacancies and are subject to development applications or have been rezoned for high density residential uses. Real estate analysis prepared by CBRE forecasts Epping to lose 17,900 square metres of commercial floorspace to residential development from 2015 to 2020.

The loss of these employers is significant as these businesses are in industries identified as the greatest employers and industry specialisations of the Epping town centre.

Employment forecasts prepared by Transport Performance and Analytics do not consider the recent changes in office floorspace in Epping and are largely based on past trends recorded in the Census. The 2016 Census, which is not yet available for data analysis, is likely to pick up on these trends observed in consultation findings.

These trends are discussed further in the following Chapter.

3.4 Summary

Population in the Epping town centre is forecast to grow significantly in line with the forecast dwelling growth under the Priority Precinct planning controls. The population of the Epping town centre is forecast to remain relatively young, with significant proportion of the population aged in their 20s and

30s. These populations generally include university students and young professionals, with higher than average incomes.

Epping has a relatively even spread across the GSC's 4 job classification categories. This split of jobs indicates that Epping is an accessible location, and has attracted jobs in industries that do not rely on local populations, such as knowledge intensive jobs in professional services. Epping has a lower proportion of population serving industries than the West Central District and Greater Sydney.

Employment in retail in particular is relatively low in the Epping town centre, reflecting the scale of retail development in the centre. The relatively low proportion of retail floorspace also indicates that Epping does not meet one of the definitions of a District Centre prepared by the Greater Sydney Commission.

Recent developments in the Epping town centre have seen a significant reduction in office floorspace, with a likely corresponding reduction in employment in knowledge intensive industries, which is not reflected in the most recent employment forecasts for Greater Sydney. Given this the TPA employment forecasts have not been presented or used as a basis for projecting employment floorspace in this work.

4 MARKET TRENDS AND DRIVERS

This Chapter provides an overview of local and macroeconomic trends impacting on office, retail and other non-residential businesses and development. The information presented in this Chapter has been based on published market research and on consultation. The organisations consulted with include:

- City of Parramatta Council,
- Epping Chamber of Commerce,
- Local real estate agents, and
- Land owners within the B2 zone.

4.1 Retail market trends

While spaces for office uses in the Epping town centre are diminishing as a result of residential conversions, retail floorspace is generally being maintained at the ground floor level as part of new developments. It is expected that as the population in Epping grows, there will be increased demand for retail and other non-residential, population related uses in the town centre. Consultation with real estate agents reflects this too, with the proximity of Epping town centre to the railway station seen as a factor that is likely to drive this demand, along with the growing population.

Current market environment

Previous analysis of the commercial market in Epping has identified that retail premises are tightly held because of the desirability and relative stability of the market, and that there is a strong focus on retail servicing the resident and employee populations.[4]

Retail uses are largely located along Rawson Street, Oxford Street, Beecroft Road, Bridge Street and Langston Place, with the vast majority of retail space on the western side of the railway line, including the existing supermarket and many specialty stores. Previous analysis has identified that a significant portion of potential retail sales on the eastern side of the precinct is lost to nearby centres, due to a relative lack of services compared to the western side, and existing issues with pedestrian and vehicular connectivity between the two. In 2011, the supermarket made up 3,800 square metres of the town centre's retail space, with another 8,531 square metres in the form of specialty stores.[5] Advertised rents for retail floorspace at the time of writing are between $100 and $362 per square metre.

Consultation with existing land owners in the B2 Local Centre zone suggests that there is a perceived lack of variety in the current retail offering in Epping, and that the physical appearance of retail spaces and amenities could be updated and improved. Traffic and parking congestion have also been identified as weaknesses for the town centre.

The Epping town centre currently has a relatively high vacancy rate along retail shopfronts, particularly on the eastern side of the centre. However, this is considered to be a short term trend. These vacant sites generally form part of development applications for new mixed use development incorporating retail floorspace on the ground floor. While short term retail trade may be impacted as existing office

[4] HillPDA, 2014, *Epping town centre – Feasibility Study*, prepared for Parramatta Council, May 2014 (Commercial in Confidence).

[5] JBA, 2011, *Epping town centre Study Volume 1*, prepared for Hornsby Shire Council, Parramatta City Council and Department of Planning, April 2011.

development is demolished, the injection of new residents in the centre is likely to inject spending into the Epping town centre.

Epping sits within a wider retail system, with significant retail offerings within 3 kilometres of the centre at Carlingford, Eastwood and Macquarie Park. The prevalence of enclosed shopping centres at Carlingford and Macquarie Park in particular are likely to impact on local trade in Epping, drawing spending for higher order retailing to these centres.

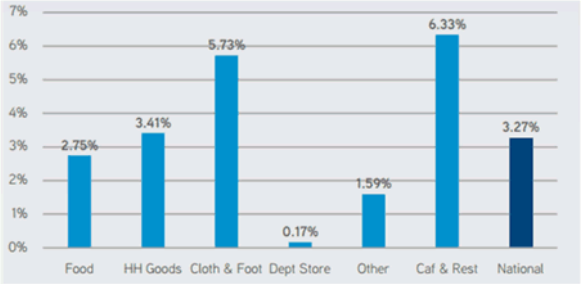
Emerging trends in the retail market

Changes in consumer spending

In the years following the Global Financial Crisis (GFC) in 2008, the proportion of household savings to income in Australia has remained high, and this is generally associated with a reduction in the amount of household income that is spent on retail. However, consumers are spending more in service and experience based areas such as travel, and in food retailing and non-discretionary categories of spending, which have continued to grow faster than discretionary retail categories.[6]

As Figure 24 below illustrates, growth has occurred in a number of retail sectors in more recent times, with the strongest growth between 2015 and 2016 in spending at cafés and restaurants and on clothing and footwear. The lowest growth was seen in department store sales.

FIGURE 24. RETAIL SALES BY CATEGORY (YEAR-ON-YEAR CHANGE, 2015-2016)



Source: Colliers International, 2016.[7]

Recent growth in consumer spending in Australia has been attributed to rising property prices, with increased household wealth and low interest rates driving domestic spending, and the decline in the strength of the Australian dollar encouraging international spending.

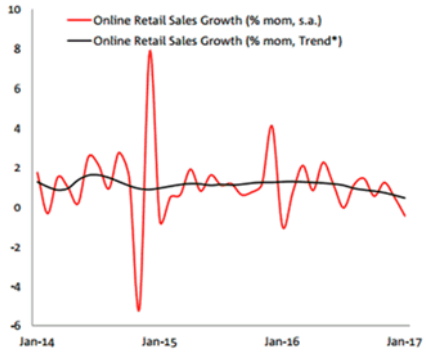
Online retailing

The flexibility and convenience of shopping online are often quoted as the reasons why people will choose it over physical stores, with the perception that customers are able to find better offers online also an important factor. The growth of online retailing has had an impact on the retail sector in Australia, and accounts for around 7% of what is spent in physical stores, however, growth in online sales has appeared to slow in recent times, as illustrated in Figure 25.

[6] Knight Frank, 2015, 'Retail demand trended upward, in 2014, what's in store for 2015,' Research briefing, Q1 2015 Issue, https://kfcontent.blob.core.windows.net/research/821/documents/en/resinsight150331c-2892.pdf

[7] Colliers International, 2016, 'Retail Second Half 2016,' Research and forecast report, http://www.colliers.com.au/find_research/retail/

FIGURE 25. GROWTH IN ONLINE RETAIL (% MONTH-ON-MONTH)



Source: NAB, 2017.[8]

The proliferation on online shopping has implications for the provision of retail space in centres such as Epping. Online retailing has a number of advantages for businesses and consumers, including wider product offerings, opportunities for innovation, strong review and referral networks via social media, and benefits from time efficiencies. However, traditional 'bricks and mortar' stores have a number of advantages as well, including being able to offer personal service, customers being able to see and test products in person, and the benefits of shopping as a social experience.

Many retailers consequently have both physical and online stores. This can help to maximise their potential revenue streams but also buffer against macroeconomic trends which tend to affect one platform more than the other, such as changes in the value of the Australian dollar which can impact on international online sales in particular.

Retail as an experience

In recent times, there has been a growing trend towards leisure-based retailing, which is more about providing 'experiences' for consumers than just products. This includes retailers focusing on customer service and providing a quality range of products to differentiate themselves from competitors. In this area, physical stores have an advantage over online retail, including in food and beverage retailers, as their products and the experience of visiting a store is not available online. The presence of international retailers in both shopping centres and on high streets is reflective of this trend as well, along with the rise in the number of cafés and options for outdoor dining in and around retail centres.

The growth of shopping as an experience is also reflected in the emergence of 'slow retailing,' in contrast to 'fast retailing' which is based on quick turnover of inexpensive, simple and standard retail products for a mass audience. Slow retailing provides more tailored products, where retailers aim to distinguish themselves from competitors through the individuality and quality of their merchandise, targeting niche markets, and engaging with the customer at a more personal level. These types of retailers may also focus on providing locally produced stock and providing a higher level of service.

Rise of regional shopping centres

A number of suburban centres in Australia's major cities have emerged as preferred locations for both retailers and customers, including the Macquarie Centre. This trend of decentralisation away from CBDs has been driven by several factors, including growing affluent suburban populations, corporate chains with fewer ties to locality and the ability to move to areas with demonstrated demand, and changes in sales tactics that require larger stores and parking availability.

[8] NAB, 2017, 'NAB Online Retail Sales Index,' Monthly Report – January 2017, http://business.nab.com.au/wp-content/uploads/2017/03/NORSI-January-2017.pdf

The growth of these types of centres is expected to continue. Regional shopping centres are also typically marketing themselves as destinations for leisure in order to attract customers. This may have implications for the retail market in Epping, particularly as it is in close proximity to the Macquarie Centre, which is also planning an expansion on its site to include residential and entertainment uses in addition to its existing retail functions.[9]

Bulky goods retailing

The bulky goods retailing sector has been performing strongly in recent years, driven by growth in housing construction and demand for household goods, though the rate of growth in households goods retailing in the year to November 2016 (3.5%) was much lower than the previous year (6.2%).[10]

Growth in the sector is expected to continue with price growth in the housing market and low interest rates. Consumer desires for tactile shopping experiences are also expected to continue to contribute to demand for bulky goods retailing. However, the sector generally requires buildings with larger floor areas than other types of retail or commercial uses.

Change in inner suburban supermarkets

Historically, the grocery market in Australia has been dominated by Coles and Woolworths, accounting for more than 70% of the market in 2015.[11] However in the last 10 years major competition from IGA and Aldi has seen their dominance reduce.

Many shopping centres and high street shopping strips are still anchored by at least one of these stores. However, there changing consumer preferences are driving demand for different forms of grocery retailing. This includes a small but growing level of demand for organic foods, in line with growing awareness around how food is produced and its environmental impact. The growth in the number of people adhering to vegetarian, vegan and other diets are also likely driving demand for more specialised food offerings. The popularity of farmers' markets in Sydney and elsewhere also illustrates the rise in demand for this form of retailing.

Deregulation of trading hours

Relaxation of permitted opening hours for retail stores over recent decades has shifted the way that people tend to shop. Demand has drifted to the weekends, and smaller, neighbourhood level stores appear to have become less important. The shift has been particularly noticeable in longer opening hours for supermarkets.

Longer retailing hours can be important to particular forms of retail that can support night-time economies, including restaurants and movie theatres.[12] Deregulated trading hours also provide benefits to customers in added convenience, greater competition between retailers, and potentially allow for greater employment in the retail sector.

4.2 Office market trends and drivers

Current market environment

Consultation undertaken with commercial real estate agents working in the Epping area suggests that there are a number of factors that attract tenants to Epping. These include the relatively lower cost of commercial office space, particularly when compared to other markets like Macquarie Park, and features such as the lack of parking levies in the area. Epping's transport accessibility, both for residents living on

[9] See Macquarie Centre, 2017, 'Stage 1 concept development application,' https://www.macquariecentre.com.au/development

[10] CBRE, 2017, 'Australian Retail, Q4 2016 – Rent growth moderating,' Marketview research report.

[11] Roy Morgan Research, 2051, 'The ALDI effect: Australia's changing supermarket scene,' 22 June 2015, http://www.roymorgan.com/findings/6297-aldi-effect-australias-changing-supermarket-scene-201506220132

[12] JLL, 2013, 'The evolution of Brisbane Retailing', Research report, July 2013, http://www.jll.com.au/australia/en-au/Research/JLL-AU-Advance-The-Evolution-Of-Brisbane-Retailing-July2013.pdf

the north shore of Sydney and its strong connections to major employment and commercial centres, is also a significant drawcard for agents, and for the existing commercial land owners consulted.

However, there is currently very little available commercial space in the town centre, for either rent or sale. One real estate agent suggested that as little as 1,500 square metres was currently available for rent across the office market. As such, the vacancy rate in Epping is low, and available space is limited to only of a few sites across the town centre. The lack of available commercial space was confirmed in consultation with the Epping Chamber of Commerce and current land owners in the B2 zone. The Chamber in particular identified that a lack of available spaces, coupled with unfavourable lease terms, is causing many businesses to leave Epping, and that business confidence in Epping is generally poor.

Advertised rents for office space in Epping currently range between $228 per square metre up to $587 per square metre.[13] The majority of spaces on the market currently are less than 500 square metres, with larger spaces primarily advertised as short term leases only. Rental prices for commercial stock have also largely been static for 12 months. The stock that is available in the town centre is also only rated as low B-grade quality

Analysis of developments in the pipeline for Epping also shows that there is very little in the way of stand-alone commercial stock expected to be delivered in the centre in the near future, with most proposed commercial or retail floorspace to be included as part of residential developments.[14] This ongoing lack of pipeline supply has been raised by the Chamber of Commerce as a major issue of concern.

There are several factors which are contributing to the low current office vacancy rate in the town centre, including increased competition from higher-order nearby commercial centres and the conversion of existing office blocks to residential uses.

Competition from residential uses

Commercial uses in the Epping town centre are being significantly impacted on by growth in the residential market, and particularly by the withdrawal of office market stock for conversion to residential uses. In recent years, the property industry has forecast that the demand for residential development in the Sydney metropolitan region would cause withdrawals of office stock from non-CBD locations, with many office buildings to be sold to residential developers.[15] Epping was identified as an area where there would likely be a concentration and continuation of office floorspace withdrawals, along with that occurring in centres such as Burwood and Hurstville, as these smaller suburban markets are expected to become largely residential hubs.

The rezoning of centres like Epping to encourage the development of more housing has meant that the highest and best use of many sites is now residential. This trend for residential conversions has also been observed across Sydney's suburban office markets, with the withdrawal of office space outpacing new supply.[16]

Some reports estimated that there would be a 34% (or close to 18,000 square metres) decline in office space in Epping in the three years following the zoning changes.[17] It was also predicted that this would cause larger tenants to move out of Epping and other centres such as North Sydney and St Leonards,

[13] Prices sourced from http://www.commercialpropertyguide.com.au, accessed March 2017.

[14] Based on Cordell Connect data, http://www.cordellconnect.com.au/

[15] See Pryor, 2015, 'Residential Conversion Plays: What do they mean for Sydney suburban office markets?' CBRE Viewpoint research report, May 2015; Raine & Horne Commercial, 2016, 'Office Market Stock Levels,' 23 February 2016, http://www.rhcop.com.au/property-news/2016/february/23/office-market-stock-levels.aspx

[16] See Knight Frank, 2016, 'Sydney Suburban Office Market Overview,' February 2016.

[17] See Pryor, 2015.

which have also seen significant reductions in commercial floorspace as the number of residential conversions increased, and as the supply of new office buildings in the pipeline has been limited.[18]

Consultation with real estate agents has identified that since the zoning changes implemented in the town centre and the designation of Epping as a Priority Precinct, the pace of residential conversions and demand for housing in the area has grown dramatically. A substantial number of sites that were previously office buildings have been converted, which has left only a small number of buildings with available office space, contributing to the low vacancy rate. There is also evidence that local businesses have been and are currently unable to stay in the Epping area after their buildings have been converted for residential uses, and this has been identified as an issue by current land owners in the B2 zone as well.

Industry research has suggested that buyers for commercial property are primarily interested in suburban markets for value-add and redevelopment opportunities. This was reflected in consultation with agents, where sales activity and prices have been generally stagnant in Epping, except for commercial properties with redevelopment potential for conversion to residential uses.

Consultation with existing land owners (including both those who have current plans to redevelop and those that do not) suggests that most would like to see a mix of commercial, retail and residential uses on their sites in future. Some indicated that they would consider providing retail shops and office space in addition to spaces at the ground floor level, to meet the demand for such uses and support the commercial and retail role of the Centre, but that this would be limited by site and zoning constraints and the overall preference is to include residential given current property market conditions.

There is also some evidence that landlords of commercial sites in Epping are only offering lease terms of around two to three years. This would ensure that they would have the opportunity to convert their properties to residential uses and take advantage of the current residential property market. The Epping Chamber of Commerce has identified that businesses are also leaving Epping because they are unable to obtain leases without demolition clauses.

Competition from nearby commercial centres

As well as a withdrawal of office stock from the market, competition from nearby commercial centres is also impacting on the Epping town centre. The most significant competitor to Epping is Macquarie Park, and as it expands and develops greater amenity it is expected to continue to attract commercial tenants that may have been displaced by residential conversions.

Industry research has indicated that many larger companies have already relocated to Macquarie Park from former commercial buildings in Epping. Among the businesses which are planning to leave Epping or have already relocated according the Epping Chamber of Commerce are:

- The Westpac Card and Call Centre for Australia,
- Unilever Australia Research and Corporate Headquarters,
- Baptist Community Services,
- Hasbro,
- NEC Australia,
- Craig & Rhodes Surveyors,
- Chill IT, and
- Northern District Times Newspaper.

Larger centres like Macquarie Park, Parramatta, and the Sydney CBD are expected to be more popular than suburban areas such as Epping, where there is less available and upcoming supply, less organic growth, and fewer large commercial floorplates available. Tenants are also unlikely to be attracted to smaller and cheaper suburban markets and away from these centres, as cost is only one element of

[18] See CBRE, 2017, 'Australia Office, Q4 2016 – Office cycle reaching bottom, Limited new supply in 2017,' CBRE Marketview research report.

decisions made about where to locate, with transport accessibility, talent availability and amenity also important.

The withdrawal of existing office uses from Epping was expected to impact on demand from tenants who require larger floorplates with a lack of oncoming supply in the centre and proximity to the campus style business park in Macquarie Park. This was confirmed in consultation with local real estate agents, who indicated that very few large office spaces are currently available in Epping, and that numerous tenants had relocated to Macquarie Park in recent years. This trend may potentially be slowed with the temporary closure of the Epping to Chatswood rail line as it is converted to the Sydney Metro network but is unlikely to be stopped.

Consultation with real estate agents also identified that tenants looking for space within the Epping town centre generally need floorspace of less than 200 square metres. There is currently very little interest from bigger companies in Epping, likely because they understand that there is not much available in the way of large and suitable spaces in the town centre but also because of trends to centralise operations and consolidate in larger centres with a fuller range of complementary businesses and where agglomeration economies are available. The lack of available space is also a concern for business groups in Epping, whose membership base has declined as tenants have relocated out of the town centre.

As well as Macquarie Park, there is indirect competition in the commercial market coming from some of the smaller nearby markets, such as Chatswood, Hornsby and Pymble, and previously at Pennant Hills, though the impact of competition from these centres has been far smaller than the impact from Macquarie Park. The Chamber of Commerce indicated that Rhodes is another competing location, with at least one long-standing Epping business relocating there after they could not obtain a suitable space and lease terms in Epping. In contrast, very few businesses are relocating to Epping from other centres.

Emerging trends in the office market

Industry changes

As identified above, the reductions in available commercial floorspace is changing the types of businesses that are located in Epping. Consultation with real estate agents suggests that the office tenants that have remained in or are looking for space in the Epping town centre are largely small business services and advisory firms, typically with around six to eight employees.

Members of the Epping Chamber of Commerce have historically included a range of businesses from different industries, and include healthcare practitioners, real estate agents, lawyers, accountants, IT consultants, surveyors, restaurants, and up to medium sized corporations. Epping's employment focus appears to be shifting away from these knowledge intensive jobs to population serving industries, including real estate agents, restaurants, and tutoring colleges, which were reported to have increased in recent years. As identified above, the withdrawal of suitable stock coupled with competition from Macquarie Park has meant that there are no large corporate tenants in the town centre.

Flow on effects from other centres and infrastructure investment

As the Parramatta CBD grows and commercial development there increases, it may be that smaller, population servicing businesses exit that market. Epping is a logical potential location for these types of businesses to re-establish themselves in. Recent analysis of the commercial office market has suggested increased demand for office floorspace in Sydney's north-west as the Sydney Metro North West is completed. Demand is forecast to increase for sub-1,000 square metre office spaces, however most of this forecast demand is envisaged along the western end of the Sydney Metro rather than in Epping, especially the Norwest Business Park.[19]

Macroeconomic trends

[19] Knight Frank 'Sydney Suburban Office Market Overview March 2017', March 2017 https://kfcontent.blob.core.windows.net/research/308/documents/en/sydsub1703-4568.pdf

There are also broader trends and changes occurring in office markets that may affect the way that commercial spaces in Epping are provided and used in future. These include changes in the Australian economy, with the shift towards service-oriented and professional industries; the decline in manufacturing and other traditional industries; the implications of an ageing population and expected growth in health service industries; and the importance of location and transport accessibility to businesses, particularly those in knowledge-intensive industries.

Co-working spaces

Another important trend that impacts on the way that office space is provided and used is the growing use of shared co-working spaces. This trend has been observed worldwide, with the number of co-working locations expected to increase to 12,700 across the globe in 2017. Technology advancements, changing workforce demographics, and shifts in major industries are driving the growth of co-working in Australia, with the number of co-working spaces in Sydney growing by 41% per year in the last 10 years.[20]

The main advantages of the co-working model over leasing traditional office space include that companies have lower costs associated with workspaces, and can benefit from collaborative working environments with other firms and industries.[21] The flexibility that co-working offers firms is also seen as an advantage, with spaces often available on a weekly or monthly basis, and the model has become particularly popular for start-up businesses.

Locating co-working spaces in suburban commuter hubs has also become popular, with the NSW Government supporting Smart Work Hubs at Rouse Hill, Oran Park, and Penrith in Sydney's west. These Hubs provide a range of options for hiring space, from daily passes to monthly arrangements with different amenities included in the pricing.[22] A number of privately operated co-working spaces have also been established in the Parramatta CBD. The growing trend for these more flexible forms of rental of commercial space could have implications for how much office space is required in the Epping town centre in future.

4.3 Other non-residential uses trends and drivers

The expected growth in the population of the Epping town centre is likely to drive a need for different non-residential uses in addition to more housing. This will include facilities such as gyms, child care centres, health centres and educational facilities, as well as civic services. As identified above, the vast majority of new development expected in Epping will be for residential units, though some residential and mixed use developments may include facilities such as gyms or child care centres as part of their commercial or retail space.

Consultation with real estate agents has suggested that with the increase in residential development and the population, there has been more inquiry and demand from ancillary type businesses for space in the Epping town centre. This has been particularly noticeable for child care centres and other educational uses, and for gyms and cafés. The Chamber of Commerce has also noted that there have been increases in the number of tutoring colleges for school children in the area. There hasn't been significant demand from restaurant owners looking for space as yet, given limited current demand, but this is expected to change as the population grows.

[20] Knight Frank, 2016, 'Sydney Coworking insight,' October 2016, https://kfcontent.blob.core.windows.net/research/1161/documents/en/resinsight161024-4197.pdf

[21] See PWC, 2017, 'Emerging Trends in Real Estate,' Asia Pacific 2017, https://www.pwc.com.au/publications/assets/emerging-trends-real-estate-2017.pdf

[22] See Space&Co., 2017, http://spaceandco.com.au/office-spaces/sydney/rouse-hill-town-centre/; Oran Park Town, 2017, http://www.oranparksmartworkhub.com.au/memberships; WOTSO Workspace, 2017, http://www.wotsoworkspace.com.au/penrith/

Analysis of developments in the pipeline for nearby LGAs Ryde and The Hills also shows a large number of developments that have been proposed or approved that are stand-alone child care centres or gyms, or included as part of residential development.[23]

These types of non-residential uses are usually accommodated in retail spaces rather than in space that would otherwise be used for offices. As such, consultation suggested that there hasn't been a noticeable impact on the office market in Epping from increased demand for these facilities so far, however increased demand for such services will likely increase competition for retail floorspace in future. Current land owners in the B2 Local Centre zone saw the provision of these types of spaces and services as less important to the role of the Epping town centre compared to its function as a place for day-to-day retail needs, housing, and office space.

Investment in child care centres is becoming more popular in the Sydney property sector, particularly in areas with growing populations.[24] The NSW Government has also recently moved to respond to increased demand and shortages of child care centre spaces by streamlining some of the rules around the development application process for child care centres,[25] which may further increase demand for child care sites.

The development of Epping in future will need to consider the balance between the provision of these types of population-serving uses with residential and commercial development, and will be particularly important if there is a downturn in the housing market. There remains the risk that the current high level of demand for housing development in areas such as Epping will limit the space that is available for these types of community-serving uses that are required for centres to function effectively over time.[26]

4.4 Epping community workshop

A community workshop was held as part of the process of preparing this report and the wider Epping Planning Review. The workshop was held on Monday 22 May and was facilitated by Straight Talk to understand the needs and desires for land uses requiring commercial floorspace of the Epping community, including residents and business owners, now and into the future. Participants were asked about how they currently use the Epping town centre, what they do not use the Epping town centre for, and the future role of Epping as a hub for employment.

The findings of the workshop were as follows:

- Epping is currently viewed as a town centre by the local community, providing for day to day needs for transport, retail and services
- Residents and workers in the Epping town centre use a wide variety of services in the centre, including community services such as the library, medical, restaurants, design and engineering services, education and public transport
- The retail offering currently in Epping does not provide a number of convenience retail options (e.g. there is currently no butcher, greengrocer, bakery etc.)
- Residents seek retail and other services out of the Epping town centre for two main reasons:
  - There is simply no local option in the Epping town centre
  - The quality of offering is better in other centres
- Participants also noted a lack a professional job opportunities in the Epping town centre.

[23] Based on Cordell Connect data, http://www.cordellconnect.com.au/

[24] See Cummins, 2016, 'Childcare properties find growing favour with investors,' *Sydney Morning Herald*, 13 May 2016, http://www.smh.com.au/business/property/child-care-properties-are-back-in-favour-20160512-gotrkr.html

[25] See NSW Department of Planning and Environment, 2016, 'More quality child care where it is needed,' Ministerial media release, 3 November 2016, http://www.planning.nsw.gov.au/News/2016/More-quality-child-care-where-it-is-needed

[26] Griffiths & Clouston, 2015, 'Successful centres: protecting Sydney's long-term productivity,' *New Planner*, September 2015, http://www.hillpda.com.au/wp-content/uploads/2015/09/New-Planner_Sept-2015_Griffiths-and-Clouston.pdf

- There was little resistance to increasing the amount of space available for new businesses and offices spaces. Many participants wanted Epping to grow and wanted to develop a new heart for the town centre.
- Flexible floorspace configurations for office and retail uses were suggested to ensure the Epping town centre can accommodate businesses as they grow and develop into the future.
- There is a desire to maintain the strong community feel of the Epping while having access to essential services and facilities of a town centre

4.5 Role and opportunities for the Epping town centre

Based on the consultation undertaken with the organisations identified above, analysis of market trends and Epping town centre's economic profile, and the current retail and office environment, there are a number of key issues and opportunities for the Epping town centre.

Epping's retail offering largely services the local catchment and provides a day-to-day convenience offering. Weaknesses of the retail offering of Epping raised through stakeholder consultation include a lack of variety and shabby appearance of existing retail stock. The redevelopment of existing retail sites provides the potential for tis floorspace, where appropriate, to be replaced with newer shopfronts and may potentially change the variety of retail on offer as the population of the Epping town centre increases.

Epping's proximity to largely enclosed shopping centres, including the significant regional Macquarie Centre, limit the potential of the Epping town centre to act as a higher order retail centre in the current market. The potential role for Epping in the future is likely to involve high quality service centre for local daily needs and leisure opportunities through hospitality uses such as dining.

As identified above, a key issue for the Centre is the apparent market failure occurring with regards to the provision of office space in particular. There is currently little available space in the town centre, as a result of both competition from other commercial centres and increased residential redevelopment, and what is available in the Epping market is not meeting current demand.

In addition to this, the spaces on offer are largely smaller spaces, which do not cater to the needs of larger businesses and organisations. As a result, many of the larger tenants who have previously located in Epping have moved to other commercial centres where both larger floorplates and newer buildings are available. It is unlikely that this situation will be reversed in Epping, given the locational advantages and size of some of the competing centres nearby to Epping, particularly in Macquarie Park and the Parramatta CBD.

However, there are several trends and drivers that Epping is likely to continue to benefit from which could be capitalised on in the future development of the town centre. Epping is already a popular centre, particularly for smaller businesses. The town centre also has the benefit of excellent public transport access and connectivity to the Sydney CBD and other major centres, which is valuable to both residents and people who work in the centre.

Epping's population is forecast to grow substantially as a result of the increased residential development in the area. This is beneficial in terms of providing a larger consumer catchment for businesses in the town centre to draw on, as well as in providing a larger potential workforce. As identified in previous chapters, the population of Epping is forecast to remain relatively young, and have a high level of labour force participation.

Epping also has a higher than average concentration of jobs in knowledge intensive industries and jobs in health and education compared to both the West Central District and Sydney overall, as shown in Table 4. There may be opportunities to capitalise on this concentration in the types of spaces included in future development, together with the existing transport accessibility of the Centre, which is known to be particularly important for knowledge-intensive employment. Epping may also be able to cater to the

expected demand from smaller-sized businesses exiting the Parramatta CBD market, as that centre continues to expand and increasingly caters to larger businesses as Sydney's second CBD.

While there is increasing pressure for residential development in the centre, the current land owners consulted with generally recognise the importance of retaining and providing for both office and retail uses, as these will be important to the ongoing viability and functionality of the centre along with increased residential development. Provision for other non-residential uses is seen as less important, though demand for services such as gyms and child care centres, and other population based services are likely to emerge as the population grows.

Given Epping's close proximity to other strategic centres at the metropolitan level and the issues identified above, the role of Epping could therefore be seen as a sub-district centre, which meets the needs of a local residential population as well as providing higher-order services and commercial space for small to medium sized businesses.

5 RETAIL DEMAND ASSESSMENT

This Chapter assesses the forecast future demand for retail floorspace in the Epping town centre. This analysis considers the Epping town centre as part of a wider retail system including Carlingford and Eastwood retail centres.

5.1 Existing and future retail supply

The local retail market

Epping centre is located within a local retail market SGS has defined which comprises an estimated 89,300 residents in 2016. The local retail market comprises the suburbs of Epping, Marsfield, Eastwood, Denistone, Denistone East, Dundas Valley, Telopea and Carlingford. The definition of this local market is based on a spatial analysis of likely customer behaviour and known trade patterns from businesses based within the market. Behaviour and expenditure patterns have been estimated to reflect logical travel patterns. This has been informed by a review of the geographic features which may obstruct travel and limit the number of retail centres which can be conveniently accessed. Shoppers will be prepared to travel further and longer for specialised, higher order centres where travel is offset by convenience of the wide variety of goods available in one location. This behaviour is serviced by sub-regional and regional centres, and the local market definition has reflected the retail centre hierarchy in the district.

The defined local market is geographically constrained to the north by the limited north-south permeability of the M2 Motorway. Residents in suburbs beyond the local market have been assessed as within the primary sphere of influence of other key retail centres, particularly in Macquarie Park, North Rocks and strong retail centres in Ryde.

Within the local market the key retail centres are the neighbourhood-scale activity centres at Epping and Eastwood and the sub-regional centre and main street retail in Carlingford.

Each of these centres also serves an additional component of trade drawn from beyond this market, such as workers who reside beyond the immediate district, as well as other incidental and transient trade. As trade from these customers is more infrequent and incidental a geographic distinction has been drawn between these shoppers and residents living in the local market. Further analysis of these patterns is outlined in Primary Trade Area definitions in the Demand section.

Similarly, not all retail expenditure from residents living in the local market is captured by these centres. Expenditure from residents which is spent outside this local market is dispersed across a wide geographic area. A network-wide review of spending patterns is beyond the scope of this study, but logical assumptions can be made.

Regional centres at Macquarie Park, Top Ryde and Castle Hill serve higher order retail needs of residents in the local market, as these are the nearest sources of department stores, discount department stores (other than in Carlingford Court) and a variety of specialised mini-majors.

Epping

The retail centre is located along Beecroft Road and Oxford Street, with some additional provision along Carlingford Road and Langston Place. The retail centre is bisected by the rail line with the only at grade

connection along Epping Road. The largest retail tenant is a freestanding Coles supermarket of approximately 3,800sq.m. Gross Leasable Area (GLA). Epping town centre also contains significant hospitality uses, including the Epping Club and the Epping Hotel.

The Epping town centre has a mix of specialty hospitality businesses and local services. Clothing retailing is limited to a handful of small retailers, and the centre lacks large format retailers other than Coles. The estimated retail floorspace of the Epping town centre at 2017 is shown in Table 5.

TABLE 5. ESTIMATED FLOORSPACE BY RETAIL TYPE – EPPING

	Supermarkets/ Convenience stores	Specialty - Other Food	Hospitality and Entertainment	Specialty - Other Retail & Services	Specialty - Clothing and Soft Goods	Department Stores & DDS	Bulky/Household Goods	Total (Occupied)
Floorspace	3,800	666	3,496	583	749	0	2,164	**11,458**

Source: SGS, 2017

Approximately 1,665 square metres of GFA is estimated to be vacant as at January 2017, which indicates a retail vacancy rate for the centre of 14.5%, which is relatively high for an established suburban market.

Eastwood

Eastwood is a predominantly main street-based, neighbourhood centre focussed around Rowe Street on both the eastern and western side of the railway line. Eastwood is located approximately 3 kilometres from the Epping town centre. The majority of retail floorspace and retail activity occurs on the western side of the rail line. The centre contains significant Chinese and Korean restaurants and shops to cater to the needs of local residents of these ethnicities. Eastwood Shopping Centre is the largest retail landholding in the centre, and is an enclosed shopping centre containing Woolworths and a large local bulky goods retailer. Eastwood also contains an Aldi supermarket and three independent supermarkets. The estimated retail floorspace of the Epping town centre at 2017 is shown in Table 6.

TABLE 6. FLOORSPACE BY RETAIL TYPE - EASTWOOD

	Supermarkets/ Convenience stores	Specialty - Other Food	Hospitality and Entertainment	Specialty - Other Retail & Services	Specialty - Clothing and Soft Goods	Department Stores & DDS	Bulky/Household Goods	Total (Occupied)
Floorspace	5,130	5,452	6,025	4,045	1,264	361	9,009	**31,286**

Source: SGS, 2017

An estimated 2,074 square metres GLA of retail space is estimated to be vacant in Eastwood, which reflects an estimated vacancy rate of 6.6 per cent of total GLA in the centre.

Carlingford

Carlingford centre is located around the junction of Carlingford Road and Pennant Hills Road approximately 3 kilometres from Epping town centre. Carlingford is anchored by a sub-regional shopping centre (Carlingford Court) and a smaller enclosed shopping centre (Carlingford Village). Additional bulky goods retail (including Bunnings) and high street retail is located along the two main roads. Carlingford Court contains Target, which is the only discount department store (DDS) in the local market and it also contains full line Woolworths and Coles supermarkets, in additional to approximately 100 speciality retailers. The estimated retail floorspace of the Carlingford centre at 2017 is shown in Table 7.

TABLE 7. FLOORSPACE BY RETAIL TYPE - CARLINGFORD

	Supermarkets/ Convenience stores	Specialty - Other Food	Hospitality and Entertainment	Specialty - Other Retail & Services	Specialty - Clothing and Soft Goods	Department Stores & DDS	Bulky/Household Goods	Total (Occupied)
Floorspace	9,083	833	1,211	968	287	8,009	19,628	**40,019**

Source: SGS, 2017

An estimated 1,800sq.m. GLA of retail space is estimated to be vacant in Carlingford, which reflects an estimated vacancy rate of 4.5 per cent of total GLA in the centre.

Development pipeline

A review of retail developments in the pipeline has been undertaken using Cordell Connect data to determine likely future retail supply. Retail developments planned or under construction within the catchment have been considered. A summary of the findings is shown in Table 8, including proposed retail floorspace in the Epping town centre replaces some existing retail floorspace. Appendix 8.3 provides further detail on the retail development in the pipeline.

TABLE 8. RETAIL PROJECTS IN LOCAL RETAIL MARKET AS AT MAY 2017

	Epping	Eastwood	Carlingford
New floorspace	6,512	2,764	499
Floorspace to be replaced	2,366	0	0
Net new floorspace	4,146	2,764	499

Source: Cordell Connect (2017)

Table 9 below outlines the existing estimated retail floorspace by food and non-food retail floorspace in the three centres.

TABLE 9. SUMMARY OF ESTIMATED FLOORSPACE SUPPLY IN THE LOCAL MARKET

	Epping	Eastwood	Carlingford	Total - 2016
Estimated Food floorspace	7,962	16,606	11,127	35,695
Estimated Non-Food floorspace	3,496	14,678	28,892	47,066
Vacant space	1,665	2,074	1,800	5,539
Vacancy rate	14.5%	6.6%	4.5%	6.7%
Total Floorspace	**13,124**	**33,358**	**41,819**	**88,300**

5.2 Retail floorspace demand

Calculating retail floorspace demand

Primary Trade Areas

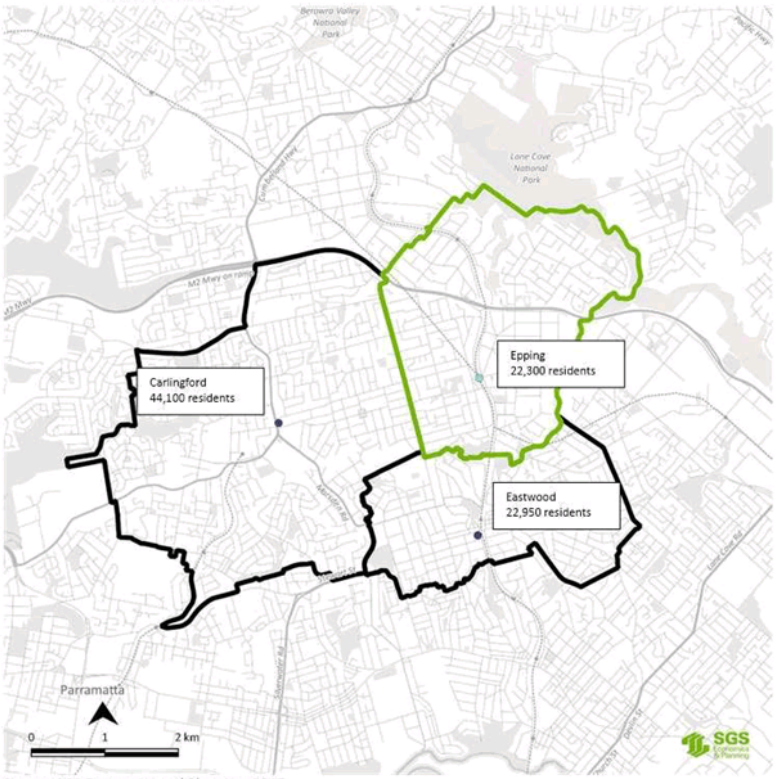
Primary Trade Areas (PTAs) have been estimated for the three retail centres outlined above. As the term suggests, residents within PTA boundaries of a centre primarily (but not exclusively) visit the local centre to satisfy their retail needs. PTAs reflect the convenience and competitive nature of the retail market and have been drawn considering the scale and variety of retail in each centre, the proximity to other centres, transport connections and geographic barriers. Residents outside a centre's PTA boundaries shop primarily at another centre, or several centres if their area is contested by multiple centres in close proximity.

The PTAs for the three centres are shown in Figure 26. The PTA boundaries are somewhat irregular as they are based on Travel Zones (TZs) as defined by Transport for NSW. These TZs are the smallest available geographies for which the latest small area population and employment forecasts are available to conduct demand modelling.

Macquarie Park has been treated as an out of catchment retail centre for this study due to the complexity of modelling its regional-scale catchment, the centre's variety of retail uses, extensive time required to survey and categorise its current floorspace mix and uncertainty around the specifics of its planned expansion. From a retail network perspective, Macquarie Park plays a complementary role to the three local market centres: its higher order offer fulfils retail needs that aren't available locally but it lacks the convenience and open public realm that smaller centres provide.

Secondary trade areas (STAs) are sometimes used in retail analysis, but have not been considered as part of this analysis given the complexity of the suburban retail market and project scope. STAs expand the geographic area for analysis, which introduces further subjectivity to the modelling (e.g. estimates of where secondary sources of expenditure for each centre will come from, relative to other centres). They also increase the required data on floorspace supply in the region (for centres further away from the local market), collection of which is beyond the scope of this project. Instead, total demand from beyond the PTAs for the three have been modelled for both centres based on known trade patterns, and this "Beyond PTA" pool of demand comprises all secondary, tertiary and incidental expenditure, without complex geographic distinctions.

FIGURE 26. PRIMARY TRADE AREAS & RESIDENTS – EPPING, EASTWOOD AND CARLINGFORD



Source: SGS Economics and Planning, 2017

Current retail expenditure

Data from MarketInfo has been used to determine current expenditure profiles for the PTAs. MarketInfo profiles expenditure of Australian households per capita by nine categories are regarded as an industry standard and incorporates the ABS Household Expenditure Survey and Census to reflect local expenditure patterns driven by factors such as age, ethnicity, household structure etc. MarketInfo data was applied to each Statistical Area 1s (SA1) within the PTAs. Table 10 shows the average per capita expenditure by commodity group in 2016 AUD for residents in each PTA.

TABLE 10. PER CAPITA EXPENDITURE (2016)

MarketInfo 2016 $	Food & Groceries	Bottleshop/ Tobacco	Restaurants & Cafes & Take-away	Clothing & Shoes	Furniture, Whitegoods, Homeware, Manchester & Electronics	Hardware & Garden	Other Retail	Retail Services	Total
Epping PTA	$5,404	$646	$2,753	$1,627	$2,529	$697	$1,663	$647	**$15,966**
Eastwood PTA	$5,186	$566	$2,484	$1,402	$2,240	$551	$1,419	$530	**$14,378**
Carlingford PTA	$5,115	$645	$1,763	$942	$1,814	$597	$1,312	$430	**$12,618**

Source: SGS Economics and Planning 2017, using MarketInfo 2014

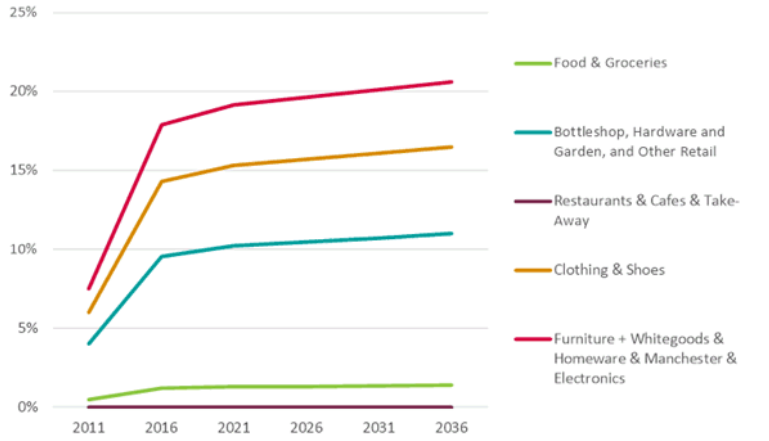
Online expenditure

Following international trends, the retail industry in Australia is transitioning to a multi-modal structure, with sales growth in online retailing estimated by the ABS[27] to have grown by 31 per cent, 23 per cent and 15 per cent in 2014, 2015 and 2016, respectively.

SGS has applied these growth rates in Figure 27 to the 2011 Productivity Commission estimates of the proportion of online retail expenditure as a percentage of total retail expenditure in Australia by commodity. This approach establishes the likely percentage of online expenditure in the future. Growth in future years has been estimated based on the reduction in the rate of growth from ABS estimates year on year from 2013 to 2016. It is anticipated that online retailing will reach maturity in the 2020s.

Online retailing expands the geographic area that goods can conveniently be purchased from, and thus reduces the demand for local floorspace. Reflecting this, commodity expenditure per capita in Table 10 has been reduced by the corresponding percentages in Figure 27 for local floorspace demand calculations.

FIGURE 27. PERCENTAGE OF RETAIL EXPENDITURE ONLINE BY YEAR – FORECAST 2016 TO 2036



Source: SGS Economics and Planning, 2017 using Productivity Commission, 2011 and ABS, 2016

[27] Australian Bureau of Statistics, *8501.0 - Retail Trade, Australia*, Dec 2016, http://www.abs.gov.au/AUSSTATS/abs@.nsf/Latestproducts/8501.0Appendix1Dec%202016?opendocument&tabname=Notes&prodno=8501.0&issue=Dec%202016&num=&view=

Epping PTA – current and future demand

Population in the Epping PTA is forecast to grow at an average annual rate of 2.3% through to 2036. Population forecasts at five year intervals are shown in Table 11.

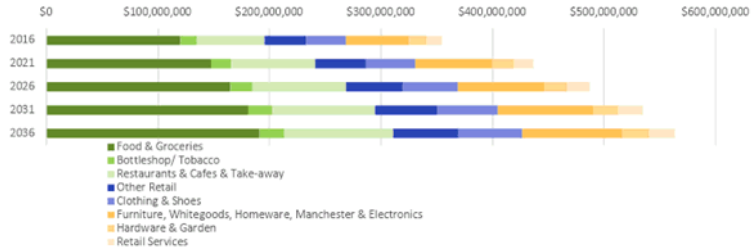
TABLE 11. EPPING PTA POPULATION - 2016-2036

	2016	2021	2026	2031	2036
Epping PTA	22,230	27,365	30,500	33,496	35,299

Source: TPA, 2016 with SGS Calculations

Applying the per capita retail expenditure from MarketInfo (Table 10) to the TPA population forecasts for the Epping PTA provides total expenditure from residents by interval year in Figure 28. Note that inflation has not been applied to keep expenditure in real terms for useful comparison.

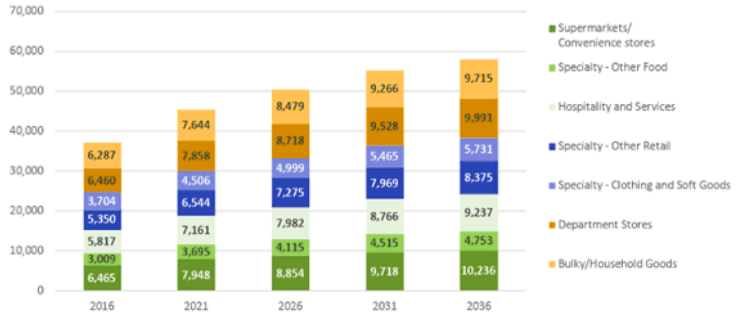
FIGURE 28. EXPENDITURE IN EPPING PTA BY YEAR (CONSTANT 2016 $ AUD)



Source: SGS Economics and Planning, 2017 using MarketInfo, 2014, TPA, 2016 and AECgroup, 2016

Figure 29 converts per capita retail expenditure to retail floorspace demand applying SGS' matrices and industry average Retail Turnover Densities (see Appendix 8.1 for further detail).
Table 12 shows the floorspace demand for the Epping town centre after accommodating for escape expenditure.

FIGURE 29.FLOORSPACE DEMAND BY YEAR - EPPING (CONSTANT 2016 $ AUD)



Source: SGS Economics and Planning 2017, using MarketInfo 2014, TPA 2016

TABLE 12. EPPING PTA FLOORSPACE DEMAND (SQUARE METRES)

	2016	2021	2026	2031	2036
Total supportable floorspace	15,291	18,804	20,950	22,999	24,226

Source: SGS Economics and Planning, 2017

Eastwood and Carlingford PTAs

The PTA populations of these centres are outlined in Table 13:

TABLE 13. EASTWOOD AND CARLINGFORD PTA POPULATION: 2016-2036

	2016	2021	2026	2031	2036
Eastwood PTA	22,961	24,213	26,226	27,819	28,643
Carlingford PTA	44,154	50,841	55,222	59,468	62,864

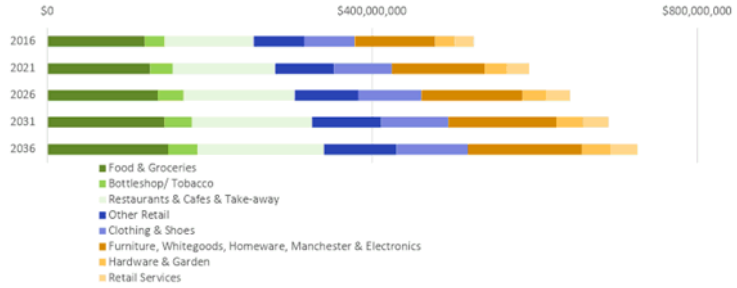
Source: TPA, 2016

As per with Epping, applying the per capita retail expenditure from MarketInfo (Table 10) to the population forecasts for the respective centres' PTAs provides total expenditure from residents by year in Figure 30 for the Eastwood PTA, and for the Carlingford PTA in Figure 31.

FIGURE 30. EXPENDITURE IN EASTWOOD PTA BY YEAR (CONSTANT 2016 $ AUD)

Source: SGS Economics and Planning 2017, using MarketInfo 2014 and TPA 2016

FIGURE 31. EXPENDITURE IN CARLINGFORD PTA BY YEAR (CONSTANT 2016 $ AUD)



Source: SGS Economics and Planning 2017, using MarketInfo 2014 and TPA 2016

Total demand for retail floorspace from Eastwood PTA residents is summarised in Table 14.
:

TABLE 14. EASTWOOD AND CARLINGFORD PTA FLOORSPACE DEMAND (SQUARE METRES)

	2016	2021	2026	2031	2036
Eastwood	14,704	15,491	16,772	17,783	18,303
Carlingford	28,277	32,526	35,316	38,016	40,170

5.3 Supply/demand gap analysis

Epping

The proportion of the floorspace demand from PTA residents which can reasonably be served by the Epping centre has been calculated in the second row of Table 15. This 'Target Market Share' has been derived as follows:

1. Applying standard industry turnover densities[28] (See Appendix) for the retail floorspace categories to the provision in Epping.
2. Estimating the proportion of the total turnover originating from PTA shoppers (50%)
3. Calculating the turnover from PTA residents at the Epping centre as a proportion of their total retail expenditure

TABLE 15. EPPING - FLOORSPACE DEMAND VS. CURRENT SUPPLY (SQ.M.) EX. VACANT

FOOD	2,016	2,021	2,026	2,031	2,036
PTA floorspace Demand	**15,291**	**18,804**	**20,950**	**22,999**	**24,226**
PTA demand serviced in Centre (50% of trade)	4,321	5,313	5,920	6,499	6,845
50% external demand (from shoppers originating beyond PTA)	4,321	5,313	5,920	6,499	6,845
Total Supportable Demand	**8,642**	**10,627**	**11,840**	**12,997**	**13,691**
	2,016	**2,021**	**2,026**	**2,031**	**2,036**
Occupied	7,962	7,962	7,962	7,962	7,962
Over (Under) supply	**-679**	**-2,664**	**-3,877**	**-5,035**	**-5,729**

NON- FOOD	2,016	2,021	2,026	2,031	2,036
PTA floorspace Demand	**21,801**	**26,551**	**29,471**	**32,227**	**33,812**
PTA demand serviced in Centre	5,353	6,519	7,236	7,912	8,302
External demand (Beyond PTA)	5,353	6,519	7,236	7,912	8,302
Total Supportable Demand	**10,705**	**13,038**	**14,472**	**15,825**	**16,603**
	2,016	**2,021**	**2,026**	**2,031**	**2,036**
Occupied	3,496	3,496	3,496	3,496	3,496
Over (Under) supply	**-7,209**	**-9,542**	**-10,975**	**-12,329**	**-13,107**

Source: SGS Economics and Planning 2017

[28] Reduced from the NSW average to reflect the low socio-economic status of Epping and accordingly lower turnover expectations for businesses in the market.

TABLE 16. EPPING SUPPLY SURPLUS/DEFICIT CALCULATIONS ('OOO SQ.M.)

No supply change	2016	2021	2026	2031	2036
Food under supply	-679	-2,664	-3,877	-5,035	-5,729
Non-food under supply	-7,209	-9,542	-10,975	-12,329	-13,107
Vacant space	1,665	1,665	1,665	1,665	1,665
Total Net Over (Under) supply:	**-6,223**	**-10,541**	**-13,188**	**-15,698**	**-17,170**

With pipeline developments	2016	2021	2026	2031	2036
Food	-679	-2,664	-3,877	-5,035	-5,729
Non-food	-7,209	-9,542	-10,975	-12,329	-13,107
Vacant space	1,665	1,665	1,665	1,665	1,665
Additional retail space (Culm.)		4,146	4,146	4,146	4,146
Total Net Over (Under) supply:	**-6,223**	**-6,395**	**-9,042**	**-11,552**	**-13,024**

Source: SGS Economics and Planning 2017

The target market share for the centre equates to 28% for food, and 25% for non-food of PTA floorspace. These targets are consistent with the calculated market shares of comparable centres in suburban areas undertaken in previous research. In addition to demand from residents in a centre's PTA an additional 40% - 50% of trade in a centre of Epping's size and role is typically sourced from shoppers originating outside the PTA (50% has been assumed, based on known trade patterns of businesses operated in the centre). Floorspace demand has accordingly been calculated to provide a total serviceable demand.

Combined local market

Viewing Epping's supply/deficit in isolation is a necessary but insufficient precondition to determining if the local market is in equilibrium

It is not realistic to expect neighbourhood scale centres to fulfil the complete retail needs of residents in their local primary trade areas. Indeed, escape expenditure occurs to some extent even from residents living close to large regional scale centres. Reflecting this, supply/demand needs to be reviewed in terms of the total local market, and target market shares for Eastwood & Carlingford have been calculated and applied. Note that while Eastwood is comparable to Epping in terms of food/non-food business mix (albeit a larger neighbourhood centre) and therefore a similar 50% estimate of PTA/beyond PTA trade has been made, Carlingford is a higher order (sub regional) centre capturing a higher proportion (55% est.) of trade from beyond its primary trade area and slightly higher target market shares.

TABLE 17. COMBINED SUPPLY SURPLUS/DEFICIT CALCULATIONS ('OOO SQ.M.)

With known developments	2016	2021	2026	2031	2036
Food	195	-4,945	-8,703	-12,182	-14,550
Non-food	3,177	-2,876	-7,292	-11,358	-14,065
Vacant space	5,539	5,539	5,539	5,539	5,539
Additional retail space (Culm.)		7,409	7,409	7,409	7,409
Net over (under supply)	**8,911**	**5,126**	**-3,047**	**-10,592**	**-15,667**
	10%	**5%**	**-3%**	**-11%**	**-16%**

Source: SGS Economics and Planning 2017

5.4 Implications

Current floorspace from the combined centres' is only slightly in excess of demand
10% is only a moderate over-supply given the limitations of the modelling and data used. A number of empirical facts support the conclusions for the modelling:

- Vacancies in Epping suggest there is some slack in the market, though this may just be frictional given the lull between the conversion of office space in the centre and the occupation of residential development.
- The known turnover of some of the largest chain businesses in the local market are comparable to or slightly lower than their fleet[29] averages. An under-supply of space would have these trading above their respective fleet averages.
- The quantum of planned retail floorspace in the development pipeline is not transformative, and some of it is only incremental – e.g. the replacement or reconfiguration of existing space at Eastwood Shopping Centre.
- Regional centres at Macquarie Park etc. will also be fulfilling some of the local demand – particularly for higher order non-food needs such as household & bulky goods (available at department stores and specialised mini majors).

With the current population projections and pipeline of retail developments adding to supply, the market is forecast to be close to equilibrium until the early 2030s
An increase in floorspace beyond approximately 5,000 square metres across the local market centres (on top of the expected quantum of floorspace coming to market indicated by Cordell in Epping, Carlingford and Eastwood) by 2021 would result in disequilibrium, assuming no change to current trade patterns. This would have a dilutive effect on the turnovers of existing businesses, although gravity modelling would be required to estimate whether this would be excessive[30]. The forecast population figures reflect planning controls developed under the Epping Priority Precinct process. They do not reflect recent planning proposals submitted to Parramatta Council in excess of these existing controls.

Epping and Carlingford play complementary roles in the local retail system, meeting demand for retail uses now and into the future
Epping and Eastwood serve PTAs of a similar size in terms of residents, whereas Carlingford serves a geographically and numerically larger catchment due to its strategic location in the road network, centre scale and variety of retail tenancies. Eastwood has developed into a specialised neighbourhood centre, catering to the local populations of particularly Chinese and Korean ethnicity and providing a unique hospitality offering attracting spend from outside of the centre.

Epping and Carlingford are located at either end of Carlingford Road. These two centres are in close proximity and fulfil complementary roles. Carlingford provides a higher order retail offering and comparison retailing while the Epping town centre offer convenience retailing and hospitality offerings in a higher accessible location. These two centres act as two ends of a 'dumbbell' along Carlingford Road. Demand for approximately 13,000 square metres of retail floorspace is forecast for the Epping town centre over the next 20 years.

[29] 'Fleet' referring to the average turnover of all the stores for particular brands throughout Australia
[30] I.e. greater than 10%, or sufficient to reduce average turnover densities below industry averages.

6 OFFICE DEMAND ASSESSMENT

This Chapter assesses the demand for office floorspace in the Epping town centre. This assessment considers all industries apart from retail and accommodation and food service, which were forecasted separately in Chapter 5. To forecast demand for office floorspace to 2036 this Chapter considers the competitive offer of the Epping town centre and assesses three possible future scenarios.

6.1 Value of office uses in the Epping town centre

Retaining office uses is important to the sustainability of commercial centres such as Epping. This retention is particularly important in light of the 30-minute city prioritised by the GSC, where more services and jobs should be available within easy reach of residents'. Though there are some costs associated with this, there are also important benefits for both businesses and residents from doing so.

The main costs of providing and retaining office uses over other types of use may be felt by existing land owners and potential developers of sites, as the land is not being put to its most profitable use in the current market, which is housing. Retaining office space can also been seen as a cost for potential home buyers or State and local governments, as the potential space for housing in the area becomes limited.

However, the benefits of the retention of office uses include the ability to maintain an employment base in the centre. This has further benefits for a given location in ensuring day-time activity, and in supporting retail trade and other businesses, and in reducing the need to travel for the local workforce if jobs can be found locally. The aim for significant centres on the rail line with high levels of accessibility should be to maximise the diversity of uses, without contributing to scale diseconomies or undermining aims for the employment role of strategic centres. Making provision for space for office and commercial uses is also important in planning for the long-term needs of centres and communities, as once spaces are converted for residential development it is difficult and unlikely to be changed back to support such uses should demand for different types of space change over time.

6.2 Competitive offer of Epping town centre

Consultation and market research suggests that as a commercial centre, Epping is likely to be in competition with several large and small nearby centres, including Macquarie Park, Chatswood, Norwest Business Park, the Parramatta CBD, Rhodes, Hornsby, Pymble and Pennant Hills. A multi-criteria assessment of Epping and these centres against a series of attributes is shown in Table 18. These locational and other attributes are important for commercial centres to be successful, and are discussed below.

Locational attributes

Existing commercial precinct

An established commercial precinct is likely to attract further businesses to the area, as locating in an area of dense economic activity allows for economies of scale and access to larger customer bases for firms. Each centre has been ranked as low, medium or high based on their existing concentration of commercial premises and activity.

Existing population and projected residential population
The existing population of the suburb for each centre has been identified using BTS data by travel zone, along with the projected population in the next 15 and 30 years.[31] This gives an indication of the likely population catchment and customer base that each of the centres will be servicing in future.

Office floorspace
Office floorspace has been identified in square metres for each centre, based on published data, and includes occupied and vacant space.[32] The current vacancy rate for office space in each centre has also been identified where possible. The availability of space in commercial centres affects the desirability for and ability of new businesses to locate in a particular centre.

Availability of different sized floorspaces
The availability of different sized floorspaces in each centre has been noted, based on existing market research and current listing for spaces. Larger office floorplates (e.g. 1.000+ square metres) allow for larger corporations to locate in commercial centres, particularly businesses that want to have their full range of functions in one place rather than across multiple buildings or centres. Business parks have an advantage in this area, though larger commercial centres tend to offer larger floorplates as well. The flexibility of spaces can also be important to be able to suit different types of tenants.

Rental prices for commercial space
The cost of leasing commercial space is an important factor in where businesses choose to locate. A desktop assessment of advertised rents for office and retail spaces per square metre in each of the competing centres has been undertaken, and each ranked on a scale of low, medium, and high costs. Rental costs for each are also likely to be influenced by the quality of available stock, with A-grade space generally limited to the larger centres.

Road transport accessibility
Successful commercial centres need to be accessible to the labour force and to markets, with highly accessible locations preferred for commercial development. Access to arterial roads to connect commercial spaces to employees, clients and services are important. Each centre has been given a low, medium or high rating based on their accessibility to major roads.

Car parking
The availability of parking spots is important to employees, clients and customers of office and retail businesses. A low, medium or high rating has been given to each location based on the availability of public car parking spaces and whether car space levies apply in the area.

Exposure for retail
Exposure to passing trade is more important for retail premises than for office uses, though it can be a selling point for other commercial spaces. A low, medium or high rating has been given to each centre based on their proximity to major roads and centres of activity to give an indication of the number of people who are likely to drive or pass by.

[31] Based on travel zones within suburb of each centre. For Norwest Business Park, the suburbs immediately surrounding have been used.

[32] Estimates have been obtained from recent office market reports including: Savills, 2017, 'Briefing – North Shore Office,' http://pdf.savills.asia/asia-pacific-research/australian-research/australia-office-/savillsresearch-briefing-north-shore-office-q4-2016.pdf; Property Council of Australia, 2017, 'Macquarie Park's Office Market Lagging,' https://www.propertycouncil.com.au/Web/Content/Media_Release/NSW/2017/Macquarie_Park_s_office_market_lagging.aspx; Cummins, 2016, 'Norwest Business Park close to 'house full',' http://www.smh.com.au/business/property/norwest-close-to-house-full-20160413-go5j8h.html; Savills, 2017, ' Briefing – Parramatta Office,' http://pdf.savills.asia/asia-pacific-research/australian-research/australia-office-/savillsresearch-briefing-parramatta-office-q4-2016.pdf; Colliers International, 2014, *Sydney Office Market Research Report*, prepared for NSW Planning and Infrastructure, June 2014, http://www.planning.nsw.gov.au/~/media/Files/DPE/Reports/sydney-office-market-research-report-2014-06.ashx

Public transport accessibility
Accessibility by public transport is also an important factor in the success and attractiveness of commercial centres, particularly as more jobs are concentrated in knowledge intensive industries in city centres rather than in outlying and industrial precincts. A poor, fair or excellent rating has been given to each centre based on the availability of different modes of public transport and the frequency of services.

Anchor activities
The main activities and services that are available in each of the centres have been identified. This gives an indication of the level of amenity in each area, with facilities such as banks and supermarkets important for commercial centres to be built around. These types of facilities can also be attractive features for businesses to be located near.

Access to magnet infrastructure
Access to large scale infrastructure can be important for commercial centres in attracting tenants and in acting as an anchor for new development. Infrastructure such as universities can also provide access to greater populations (e.g. students), and opportunities for knowledge sharing and agglomeration benefits for businesses. A low, medium or high rating has been given to each centre based on their proximity to facilities including hospital, universities and other educational facilities.

Hospitality, retail and social infrastructure uses
Having cafés or restaurants, retail, and social infrastructure (such as child care centres) close by can be attractive for businesses, as they provide amenity to their employees, with a variety of food and drink options likely to be more desirable. Each of the locations has been rated low, medium or high based on the concentration and variety of these types of uses in their centres.

Urban amenity
The quality of the urban environment in a centre can also be an important attractor to businesses, with public spaces that are more pleasant and vibrant likely to be more desirable. A low, medium or high rating has been given to each centre based on their provision of open space and the quality of streetscapes.

Professional population
Access to a professional pool of potential employees and clients can be important to the sustainability of commercial centres. The proportion of the resident population classified as professional in the 2011 Census at the State Suburb (SSC) level has been identified for each centre.[33]

Tertiary educated population
Access to an education population is also important for commercial centres. Using the same SSC areas from 2011, the proportion of the population with a bachelor's degree or higher qualification has been identified for each of the centres.

[33] Based on 2011 Census, State Suburbs (SSC) – Epping (NSW), Macquarie Park, Chatswood, Baulkham Hills, Bella Vista, Rhodes, Parramatta, Hornsby, Pymble, and Pennant Hills.

TABLE 18. COMPETITIVE OFFER ASSESSMENT

	Epping town centre	Macquarie Park	Chatswood	Norwest Business Park	Parramatta CBD	Rhodes	Hornsby	Pymble	Pennant Hills
Existing commercial precinct	Medium. Competition from Macquarie Park and residential uses.	High. Business Park in Global Economic Corridor.	High. Strategic centre in Global Economic Corridor. Some competition from residential uses.	High. Business park and primarily commercial uses.	High. Major commercial centre and Strategic Centre	High. Established commercial precinct.	Medium. Competition from Macquarie Park and residential uses.	Medium. Localised commercial uses as well as office park precinct.	Low. Limited office space. Competition from other centres.
Existing and projected residential population	**2016: 29,223** 2031: 42,173 2046: 54,574 (87% growth 2016-2046)	**2016: 7,103** 2031: 17,630 2046: 21,605 (204% growth 2016-2046)	**2016: 28,718** 2031: 33,230 2046: 41,558 (45% growth 2016-2046)	**2016: 12,463** 2031: 26,255 2046: 36,699 (194% growth 2016-2046)	**2016: 20,730** 2031: 45,632 2046: 64,253 (210% growth 2016-2046)	**2016: 11,888** 2031: 17,894 2046: 21,551 (81% growth 2016-2046)	**2016: 24,031** 2031: 27,743 2046: 32,746 (36% growth 2016-2046)	**2016: 11,458** 2031: 13,809 2046: 17,324 (51% growth 2016-2046)	**2016: 8,692** 2031: 9,400 2046: 11,214 (29% growth 2016-2046)
Office floorspace	Approx. 55,000 sqm. Very low vacancy rate.	Approx. 873,000 sqm. Slowly increasing vacancy rate, estimated at 7.5%.	Approx. 278,000 sqm. Estimated 7.7% vacancy rate.	Approx. 58,000 sqm. Low vacancy rate, estimated at 6%.	Approx. 707,000 sqm. Low vacancy rate, estimated at 4.3%.	Approx. 144,000 sqm. Low vacancy rate. Limited capacity for expansion.	Approx. 27,490 sqm*	Approx. 79,000 sqm*	Approx. 1,994 sqm*
Type of office floorspace available	Small floorplates only. Larger businesses relocated to other centres, remaining floorspace limited in size.	Large and small floorplates. Currently attracting larger tenants from other centres.	Large and small floorplates.	Large and small floorplates. Business park format allows for larger floorplates.	Large and small floorplates. Attracting tenants looking for larger spaces and CBD location.	Large and small floorplates.	Smaller floorplates only.	Smaller floorplates only.	Smaller floorplates only. Limited office stock in general.
Rental Prices (office and retail)	Low	Medium	High	Medium	High	Medium	Low	Medium	High**
Road transport accessibility	Medium. Beecroft Road connecting to M2, some congestion at peak times.	High. M2, though some congestion around afternoon peak.	High. Pacific Highway, though some congestion at peak times.	Medium. Close to M7 and Old Windsor Road, congestion within Park around peak times.	High. M4, though congestion at peak times.	Medium. Close to M4, but congestion particularly at peak times.	Medium. Nearby to Pacific Motorway, limited congestion.	High. Pacific Highway, limited congestion around centre.	Medium. Pennant Hills Road connects to M2 and Pacific Motorway, significant congestion.

	Epping town centre	Macquarie Park	Chatswood	Norwest Business Park	Parramatta CBD	Rhodes	Hornsby	Pymble	Pennant Hills
Car parking	Medium. No parking meters, but high utilisation of Council car park and on-street spaces.	Low. On-street parking fees recently increased in response to congestion.	Low. NSW Parking Space Levy applies. Council has aimed to limit amount of parking in the area.	Medium. Space provided with most buildings, and available at shopping centre.	Low. NSW Parking Space Levy applies. Most Council- provided spaces limited to short stays (4 hours or less).	Medium. Effort by Council to reduce number of cars and spaces, but free 3-hour parking available at shopping centre.	Low. Spaces in town centre generally occupied by early morning, especially untimed spaces.	Medium. Parking provided with business park buildings. Some on street and Council-run car parks available.	Low. Congestion an issue for residents. Lack of commuter spaces at railway and all-day spaces.
Exposure (primarily for retail)	High. Particularly on Beecroft Road.	Low. Retail spaces concentrated in shopping centre, motorway traffic separated from centre.	Low. Retail spaces concentrated in shopping centre, limited frontage on Pacific Highway.	Low. Separated from major arterial roads, shopfronts separated by landscaping and parking.	High. Retail not concentrated in one location, population and employment growth increasing potential exposure.	Low. Retail uses concentrated in shopping centre and largely separated from major traffic routes.	Medium. Main retail uses in shopping centre and separate from major traffic route.	Medium. Some retail uses front Pacific Highway, others within internal business park area.	Medium. Main retail area separated from Pennant Hills Road.
Public transport accessibility	Excellent. Bus and rail access. Future Metro Northwest station. Frequent services.	Excellent. Bus and rail access. Two Metro Northwest stations. Frequent services.	Excellent. Bus and rail access. Metro Northwest station. Frequent services.	Poor. Bus access only. Less frequent services.	Excellent. Bus rail and ferry access. Frequent services.	Fair. Bus and rail access. Less frequent services.	Fair. Bus and rail access. Less frequent services.	Fair. Bus and rail access. Less frequent services.	Fair. Bus and rail access. Les frequent services.
Anchor activities	Council facilities, major supermarket, health services.	State government facilities, major supermarkets, major shopping centre, banks, hospital, health services.	Major supermarkets, major shopping centre, State government facilities, banks, health services.	Major supermarkets, banks, some health facilities.	Council and State government offices, major supermarkets, major shopping centre, health services	Major supermarket, health services, shopping centre, banks.	Council facilities, major shopping centre, major supermarkets, TAFE.	Smaller supermarkets, banks, health services.	State government offices, smaller supermarkets, health services, banks.
Access to magnet infrastructure	Low. No major institutions close by.	High.	Medium.	Medium.	High.	Medium. Close to Concord Hospital, private hospitals, TAFE campus.	Medium. Close by to Hornsby Ku-ring-gai Hospital.	Low.	Low.

	Epping town centre	Macquarie Park	Chatswood	Norwest Business Park	Parramatta CBD	Rhodes	Hornsby	Pymble	Pennant Hills
		Close to Macquarie University, Macquarie University Hospital.	Close to several private colleges, private hospitals, nearby to UTS campus.	Nearby to TAFE and private colleges, and Norwest Private Hospital.	WSU campus, future UNE campus, close to Westmead, CBD location.				
Hospitality, retail and social infrastructure	Medium. Council library, mix of retail, large range of food outlets, limited child care centres currently.	High. Major shopping centre retail, child care centres, range of food options.	High. Council library, major shopping centre retail, child care centres, range of food options.	Medium. Range of shops and food outlets at Marketown shopping centre, child care centres.	High. Council library, major shopping centre retail, range of food options, child care centres.	High. Major shopping centre retail, range of food options, many child care centres.	Medium. Council library, major shopping centre retail, mix of local and chain food outlets, few child care centres.	Low. Limited retail offering, mostly local food outlets, limited child care centres.	Medium. Council library, mix of local and chain food outlets, limited retail offering, some child care centres.
Urban amenity	Medium. Major roads remain car dominated. Limited open space in the centre. Good location for transport accessibility.	Medium. Limited after-hours activity, but likely to improve with residential and commercial expansion.	High. Limited public open space, but some pedestrianised areas. Good accessibility.	Low. Car dominated environment. Large distances between buildings less conducive to pedestrian amenity.	High. Limited public and green space currently, but improving. Good accessibility.	Medium. Green space nearby and some pedestrianised areas. Good accessibility, but car dominated particularly on Concord Road side.	Medium. Some open space nearby but not in centre.	Medium. Some public spaces. Some pedestrianised areas but largely car dominated, particularly in business park area.	Low. Limited public space. Car dominated.
Professional population	19.6%	18.7%	18.0%	15.1%	14.9%	18.4%	16.6%	19.1%	18.3%
Tertiary educated population	35.1%	36.4%	35.3%	22.9%	32.9%	40.4%	29.1%	37.5%	32.2%

*Floorspace estimates from *Ku-ring-gai & Hornsby Subregional Employment Study*, SGS Economics & Planning, 2008. Estimate for Pymble includes Pymble Business Park.
**High prices for Pennant Hills due to a small sample size of available commercial rental properties.

Conclusions on Epping's competitive offer

Epping's resident population is expected to be larger than the other suburban centres like Hornsby, Pymble and Pennant Hills, and is expected to have a high rate of growth over the next 30 years. Epping will also have a larger resident population than Macquarie Park, and have a comparable level of highly educated and professional people to draw on.

Epping generally has the benefit of lower prices for office rentals than the larger centres, however, this is likely to be attributable to a lack of A-grade stock in the area. The currently low vacancy rate for office space limits the competitiveness of Epping, particularly when the larger centres have more space overall and higher vacancy rates (with the exception of Parramatta).

The limited availability of large floorplates is a disadvantage for Epping compared to Norwest and the major centres in attracting larger office tenants, and as identified previously, this is being exacerbated by the encroachment of residential uses into the commercial core. Residential conversions are also affecting some of the other centres such as Macquarie Park and Hornsby, though perhaps not to the same extent.

Epping ranks well for its transport accessibility, on par with the major centres in the Global Economic Corridor, being in close proximity to major arterial roads as well as frequent public transport routes, including the future North West Metro. The lack of a parking levy has also been noted as an advantage for Epping compared to Parramatta and Chatswood where the levy applies, though like a number of the competing areas, the availability of parking is a common issue for workers and residents.

Epping has good exposure for retail spaces, with proximity to major roads as well as a large amount of foot traffic. Retail spaces in Epping are also not concentrated within shopping centres as is the case in Macquarie Park, Chatswood, Rhodes, and elsewhere. However, Epping is likely to lack some of the prestige that is associated with these larger commercial centres which can help to attract businesses. Conversely, a high quality main street with a diverse retail and food offering can draw additional businesses to Epping, in particular small to medium enterprises.

Epping is disadvantaged in terms of immediate accessibility to major infrastructure compared to some of the other centres, including in proximity to universities and hospitals, but the centre is in close proximity to such facilities in Macquarie Park which are easily accessible by train. Epping ranks well in terms of its hospitality offering and provision of social infrastructure. Non-residential facilities will likely increase in the area as residential development continues as well, as has been the case in Chatswood. Epping is also comparable to the smaller centres in terms of urban amenity, with similar issues around the provision of public open space and the need for better pedestrian connections.

Similarities can be seen between Epping's current evolution and that of Chatswood, with the latter beginning as a largely commercial precinct before large residential developments have been introduced in recent years. Chatswood has a more significant retail role than Epping but a similar level of transport accessibility to Epping, Chatswood has a large range of retail and food options, as well as non-residential population supporting uses such as child cares and gyms.

6.3 Office floorspace demand forecast approach

Three office floorspace demand forecasts have been developed considering the findings of this report and the competitive offer of the Epping town centre. These scenarios envisage three futures where the Epping town centre takes on different roles:

- Population serving centre – office uses service the population of Epping
- Local centre – office uses service the surrounding population (e.g. a 5-10 minute catchment)
- District centre – office uses service a wider population and attract strategic employment uses (e.g. a 20-30 minute catchment).

As noted above, there have been significant changes in Epping's office floorspace in the past few years that has not been yet reflected in Census or employment projections data (the 2016 Census data should reflect the changes when released). Rather than apply the current forecasted jobs for Epping, the three scenarios approach provides an understanding of Epping's role and function considering recent trends and consultation findings.

These scenarios do not consider demand for retail and hospitality land uses in the Epping town centre. Floorspace demand from these uses is forecast separately below.

Epping as a population servicing centre

Under this scenario, land uses occupying office floorspace only service the population of Epping. For the purpose of this scenario, the population of the suburb of Epping has been applied.

Population driven employment has been estimated by performing a regression analysis to identify the type of jobs that are linked to population, and applying population-driven employment ratios to the estimated incoming population.

Through the regression analysis, we have established the causal relationship between population and employment by industry at the Statistical Area 3 (SA3) level[34]. The regression analysis coefficients have been applied to population forecasts in Transport Performance and Analytics' LU16 for the West Central District.

It is recognised that not all employment is suitable or required to be in centres. For instance, heavy manufacturing uses are more appropriate in industrial precincts to avoid land use conflict and to facilitate their specific operations, and schools are located across different urban forms (e.g. in residential areas, in centres etc.). To determine the number of jobs which would require office space in the Epping town centre, attribution rates prepared by SGS from previous commercial analysis have been applied for jobs by industry to reflect their likelihood of locating in centres.

Table 19 shows the number of jobs in the Epping town centre by GSC job classification to 2036. Under this scenario, job numbers grow in line with the forecast population of Epping, with the greatest change occurring over the five years from 2016 to 2021. The nature of this scenario sees the majority of employment driven by population serving industries.

TABLE 19. EPPING AS POPULATION SERVING CENTRE – JOBS BY GSC INDUSTRY

	2016	2021	2026	2031	2036
Knowledge Intensive	104	139	160	180	192
Population Serving	152	203	234	264	281
Industrial	15	20	24	27	28
Health and Education	141	187	216	244	260
Total	**412**	**550**	**634**	**715**	**762**

Source: SGS, 2017
Note: Jobs in Retail Trade and Accommodation and Food Services have been removed in this analysis. Floorspace for these uses is forecast separately.

Forecast jobs under this scenario are converted to office floorspace by applying a standard floorspace to job ratio of 20 square metres (while this figure has come down in more expensive office markets such as the CBD it is a robust estimate in suburban markets such as Epping). The results of this analysis are shown in Table 20. Under this scenario, if only the needs of the resident population of the suburb of

[34] Statistical Area 3 (SA3) is a geography defined by the Australian Bureau of Statistics which is used to present data in standardised regions across Australia. The regional breakups have been designed to reflect regional identity. These are areas with both geographic and socio-economic similarities.

Epping are considered, the Epping town centre has forecast supportable demand for 9,520 square metres of office floorspace in 2036. This would represent a further reduction in office floorspace in the Epping town centre.

TABLE 20. EPPING AS POPULATION SERVING CENTRE – TOTAL OFFICE FLOORSPACE BY GSC INDUSTRY

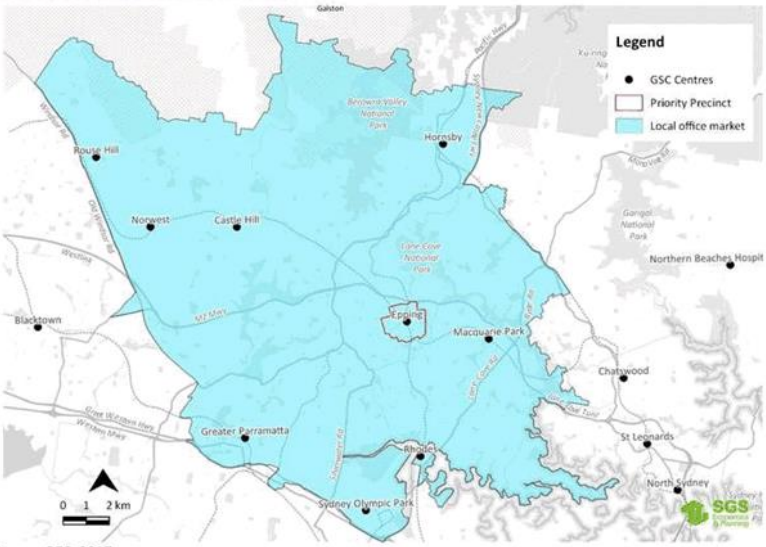
	2016	2021	2026	2031	2036
Knowledge Intensive	2,079	2,773	3,200	3,608	3,846
Population Serving	3,042	4,059	4,684	5,280	5,628
Industrial	306	408	471	531	566
Health and Education	2,811	3,750	4,327	4,878	5,200
Total	**8,237**	**10,990**	**12,683**	**14,297**	**15,240**

Source: SGS, 2017
Note: Jobs in Retail Trade and Accommodation and Food Services have been removed in this analysis. Floorspace for these uses is forecast separately.

Epping as local centre

This scenario forecasts the amount of commercial floorspace demand for the Epping town centre if it functions as a local centre as designated by the GSC. This approach considers Epping within its local office market informed from consultation sessions and SGS' competitive offer analysis. The local office market applied for this analysis extends to Hornsby, Pymble, Greater Parramatta and Rouse Hill as shown in Figure 32.

FIGURE 32. LOCAL OFFICE MARKET



Source: SGS, 2017

Forecast employment by Travel Zone prepared by Transport Performance and Analytics has been extracted for the local office market area. The forecast employment allocated to Strategic and District

centres within this catchment have been removed. These centres account for approximately 70% of all forecast employment in the local office market area.

The remaining forecast employment across the local office market has then been allocated evenly across local centres. Across this local office market, there are 28 local centres defined by the GSC.

Job numbers for local centres in the local office market have been further refined in recognition that not all jobs are appropriate or can be accommodated in centres. As per the previous scenario, attribution rates prepared by SGS from previous commercial analysis have been applied for jobs by industry to reflect their likelihood of locating in centres. Forecast jobs in the Epping town centre to 2036 under this scenario are shown in Figure Table 21.

TABLE 21. EPPING AS LOCAL CENTRE – JOBS BY GSC INDUSTRY

	2016	2021	2026	2031	2036
Knowledge Intensive	725	815	886	966	1,059
Population Serving	448	492	536	581	628
Industrial	18	18	18	17	18
Health and Education	397	430	459	489	522
Total	**1,587**	**1,755**	**1,898**	**2,053**	**2,226**

Source: SGS, 2017
Note: Jobs in Retail Trade and Accommodation and Food Services have been removed in this analysis. Floorspace for these uses is forecast separately.

Applying the current employment floorspace ratio of one job for every 20 square metres to the 5,674 jobs forecast for 2036 yields a floorspace forecast demand of 31,845. This is approximately 1,000 square metres more than the current occupied and vacant office floorspace in the Epping town centre.

TABLE 22. EPPING AS LOCAL CENTRE – TOTAL OFFICE FLOORSPACE BY GSC INDUSTRY

	2016	2021	2026	2031	2036
Knowledge Intensive	10,368	11,663	12,678	13,819	15,148
Population Serving	5,672	6,152	6,561	6,990	7,465
Industrial	264	262	254	248	252
Health and Education	6,403	7,034	7,663	8,316	8,981
Total	**22,707**	**25,110**	**27,156**	**29,372**	**31,845**

Source: SGS, 2017
Note: Jobs in Retail Trade and Accommodation and Food Services have been removed in this analysis. Floorspace for these uses is forecast separately.

Epping as a sub-District centre

This scenario recognises the earlier role of Epping as a professional services hub and builds upon the potential of the Epping town centre's existing and planned transport infrastructure.

SGS has applied a Sydney-wide accessibility model to forecast future jobs by Travel Zone across the metropolitan area. The accessibility model analyses the likely shift in jobs locating in centres and employment centres with the completion of the Sydney Metro.

The Sydney Metro has the potential to enhance the connectivity of the Epping town centre in future, linking the centre to the north west suburbs of Sydney and providing an additional connection to the Sydney CBD. This increased level of connectedness will have significant positive impacts to the Effective Job Density (EJD) of all centres located along the Sydney Metro Station Line.

Effective job density is a measure developed by SGS of the relative concentration of employment, derived from the density and accessibility of all jobs across a region. Areas with high employment and/or high accessibility to places of employment return higher effective job density scores. EJD can be improved by increasing jobs and reducing travel times. The travel time improvement assumptions underpinning the EJD uplift modelled for this analysis are outlined in Table 23

TABLE 23. MODELLING IMPACTS OF A SYDNEY METRO STATION ON ACCESSIBILITY BY PUBLIC TRANSPORT

Origin	Destination	Improvement to accessibility	Rationale
Metro Stations	to Metro Stations (within an 800 metre walking radius)	50%	E.g. 15 services form Epping to the CBD at peak hour via Macquarie Park
Metro Stations	to Metro Stations (within a two kilometre radius)	25%	Outer limit of train station catchment
Non-metro locations of Sydney	to Metro Stations	No change	The uplifts would not be significant enough to induce any observable land use changes.
Non-metro locations of Sydney	to non-metro locations of Sydney	No change	The uplifts would not be significant enough to induce any observable land use changes.

Source: SGS, 2017

Significant agglomeration economies will flow from the better access that the proposed Sydney Metro station provides, as the EJD of the Epping town centre improves. The Sydney-wide accessibility model determines a change in accessibility by calculating an EJD measure using travel times for the Sydney Metro, and then for a base case (i.e. a scenario that does not include the Sydney metro), using the discounted and non-discounted travel times respectively.

The accessibility model shifts the forecast growth in employment and dwellings prepared under Transport Performance and Analytics LU 16 to (or from) areas based on changes in travel time. The introduction of the Sydney Metro results in a changed EJD score, based off the coefficients obtained from regressing historical employment and household data from 1996 to 2011.

The Epping town centre's proximity to the train station greatly enhances its accessibility and potentially the number of jobs locating in the centre. Table 24 below outlines the forecast jobs at 2011 and 2036 for the Epping town centre under this scenario. This scenario differs from other office scenarios, using 2011 as the base year and calculating jobs for the SA2 rather than the town centre.

TABLE 24. EPPING AS SUB-DISTRICT CENTRE –JOBS BY GSC INDUSTRY

	2011	2036
Knowledge Intensive	2,048	3,209
Population Serving	1,559	1,481
Industrial	1,323	1,797
Health and Education	1,582	2,866
Total	**6,512**	**9,353**

Source: SGS, 2017

As with other office floorspace demand scenarios, a standard employment of floorspace ratio of one job per 20 square metres of office floorspace has been applied alongside an attribution rate for centre-based employment by industry. The forecast office floorspace under this scenario is 55,616 at 2036.

TABLE 25. EPPING AS SUB-DISTRICT CENTRE – FLOORSPACE BY GSC INDUSTRY

	2011	2036
Knowledge Intensive	18,691	29,287
Population Serving	6,922	6,576
Industrial	490	665
Health and Education	10,536	19,088
Total	**36,639**	**55,616**

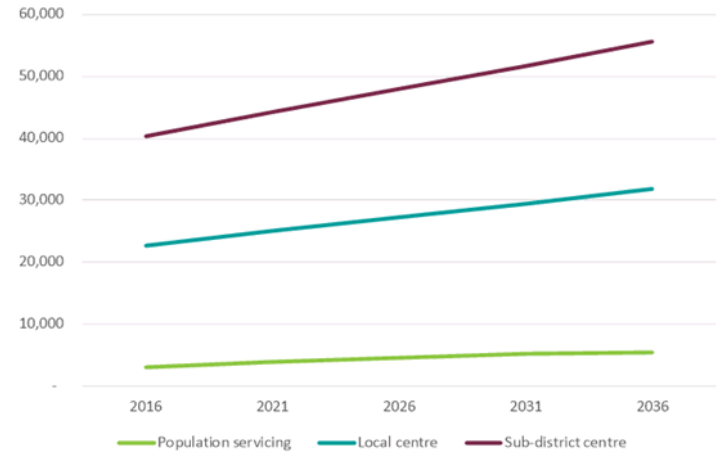
Source: SGS, 2017

However, this scenario requires 2011 as the base scenario. As noted above, the Epping town centre has lost a significant proportion of its office floorspace between 2011 and 2016. This would impact on the employment forecast prepared for the Epping town centre and subsequent floorspace demand. In light of this loss of floorspace, supportable demand for office floorspace of between 40,000 and 45,000 square metres at 2036 is considered more likely.

6.4 Implications for Epping

Three employment scenarios have been forecasted for the Epping town centre. These scenarios act as low, medium and high employment scenarios, dependent on the catchment and role of the Epping town centre. The floorspace supportable under these scenarios are shown in Figure 33.

FIGURE 33. FORECAST OFFICE FLOORSPACE SCENARIOS (SQUARE METRES)



Source: SGS, 2017

The low scenario – Epping as a population serving centre – is not considered realistic or desirable outcome for the Epping town centre. This scenario includes minimal office floorspace for the Epping town centre, relinquishing its current role as a wider services and employment hub. This would remove the potential for local employment as well as limiting the growth of local services, such as medical services, to support the populations beyond the suburb boundaries of Epping.

The medium scenario – Epping as a local centre – forecasts demand for office floorspace in line with current provision in the Epping town centre. Existing office floorspace, both occupied and vacant, would need to be provided within the redevelopment of the Epping Priority Precinct.

The high scenario represents an aspiration for the Epping town centre to function as a sub-District centre. This scenario takes Epping's locational advantages into account.

In light of the competitive offer of Epping, office floorspace demand for Epping is likely to sit between the medium and high scenario. Epping has several beneficial locational and transport attributes, however its proximity to Macquarie Park and the Parramatta CBD limit its ability to function as a strategic employment centre. Supportable demand for office floorspace of between 40,000 and 45,000 square metres at 2036 is considered the most likely limit for office floorspace for Epping if it fulfils a sub-District centre function.

7 IMPLICATIONS AND DIRECTIONS

7.1 The role of Epping town centre

The Epping town centre has been designated as a local centre in State planning documents in the expectation that it will largely accommodate residential development, with minimal retail and commercial floorspace to support the surrounding population.

The analysis of this report suggests that the Epping town centre has the potential to play a more significant role supporting non-residential uses. Epping has a relatively even spread across the GSC's 4 job classification categories. This split of jobs indicates that Epping is an accessible location, attracting jobs in industries that do not necessarily rely on local populations, such as knowledge intensive jobs in professional services.

Consultation with local real estate agents, the Chamber of Commerce, and land owners has found that there is demand for retail and office floorspace in Epping that is not currently being met. A limited supply of office floorspace in particular has also occurred in recent years, impacting on the availability of space for current and future office uses in particular.

Given Epping's close proximity to other strategic centres at the metropolitan level, existing uses and significant infrastructure assets, including access to the new Sydney metro, the role of Epping could therefore be seen as a sub-district centre, which meets the needs of a large local residential population in its immediate catchment as well as providing higher-order services and commercial space for small to medium sized businesses. This idea of Epping as a significant services and small business centre within the West Central District, catering to the diverse needs of residents within its catchment, is consistent with the strategic idea of a '30 minute city' where more employment, opportunities and services are provided within a reasonable travel distance.

If the Epping town centre is considered on its own, demand for an additional 13,000 square metres of retail floorspace is forecast to 2036. However, the Epping town centre forms part of a wider retail system. Some of this forecast demand can be met across other nearby local retailing centres, including Carlingford and Eastwood. The variety of higher order retailing available in Carlingford can complement the hospitality and convenience offering of the Epping town centre. The redevelopment of properties across the Epping town centre has the potential to enhance the variety and built form of retail uses in the centre raised in consultation.

The forecast demand for office floorspace for Epping identified earlier is 55,616 square metres of office floorspace by 2036 if Epping is to fulfil a sub-District centre function. This office floorspace could enable the Epping town centre to function as a secondary employment centre in the local office market, supporting but not competing with the major employment centres of the Parramatta CBD and Macquarie Park. The Epping town centre is likely to support local small and medium enterprises as well as some strategic knowledge intensive businesses requiring smaller floorplates in a highly accessible location.

7.2 Potential approaches

Existing retail floorspace in the Epping town centre is likely to be redeveloped and replaced with ground floor retail floorspace under the existing market conditions and planning controls framework. However, the current planning controls do not promote the provision of commercial floorspace above the ground floor and it is considered that this is likely to continue into the future as the residential market remains strong. Under current market conditions, it is unlikely that the forecast quantum of office floorspace will be provided, with existing floorspace converted to residential uses despite existing DCP controls encouraging non-residential floorspace above the ground floor.

It is therefore considered appropriate to require some commercial floorspace to be included within new development applications and planning proposals There are three general approaches that could be applied to see the delivery of commercial floorspace in the Epping town centre.

Standalone office development

There may be potential for the development of standalone office towers in the Epping town centre. However, the current strength of the residential property market is likely to 'work against' the development of a new standalone office tower as the principal development on a site in the Epping town centre. Given residential floorspace is permissible with consent this is likely to be seen as the 'highest and best use' for most sites across the town centre.

In order to ensure that standalone office towers occur, development controls would need to change to remove the potential for residential development to be the 'highest and best use'. A Commercial Core zoning, prohibiting residential development, would need to be contemplated. This would impact on land value to the detriment of land owners and purchasers who have 'factored in' prospects for residential development. Furthermore, there is no guarantee that stand alone office development would follow as pre-commitments for office floorspace are typically required before construction commences, and there may not be sufficient depth of demand for this to occur. A Commercial Core zoning is therefore not considered appropriate or viable for the Epping town centre in light of the market trends reviewed and should not be relied upon to deliver the office floorspace forecast for Epping as a sub-District centre.

This is not to say that this form of development cannot occur – changes in demand for residential and commercial property may alter demand for this type of development – however it is unlikely to be feasible in the short to medium term. The development of standalone office towers may be possible on larger sites where residential and office buildings could be 'horizontally separated', rather than in vertically separated configurations. This cannot be dictated in planning controls or relied upon to deliver the forecast office floorspace. but remains a possibility for a market-led option in the Epping town centre.

Non-residential floorspace ratio

Ideally, a mixed use shop top housing development would incorporate commercial uses above the ground floor along with residential floorspace. The inclusion of commercial floorspace in podium development at the base of mixed use towers is considered to be the most appropriate and desirable outcome for the Epping town centre

This would be achieved through the application a non-residential floorspace ratio in the new LEP for the Epping town centre. A non-residential floorspace ratio requires a minimum proportion of a development proposal's floorspace to be allocated to non-residential uses. Existing examples in Greater Sydney include the North Sydney and St Leonards strategic centres under the *North Sydney Local Environmental Plan 2012* and the Merrylands local centre under the *Holroyd Local Environmental Plan 2013*.

Development of government owned sites

The development of local and/or state government -owned land may provide an opportunity to deliver office floorspace to meet forecast demand over the next 20 years. The development of government-owned sites has the potential to act as a 'proof of concept', demonstrating the value of providing floorspace to accommodate small to medium enterprises and the development of a truly mixed use centre. Development on these site/s could include residential development. The potential for a shared work space should also be considered to support small office-based enterprises. This would require a deliberate strategy to support the 30 minute city concept with Epping as a hub and a sub-District centre.

The primary opportunity in the Epping town centre is the Ray Road/Beecroft Road sites that have been acquired by the state for the development of the Sydney Metro. These were previously zoned for business purposes (i.e. B2 Local Centre). Notwithstanding the current R4 High Density Residential zoning, these sites provides an opportunity to support the functioning of Epping as a sub-District centre with a true mix of uses, potentially incorporating commercial floorspace on the first few storeys and/or a standalone office tower.

It is recognised that this option is largely outside of Council's control and involves engagement with and support of the NSW government and relevant state agencies which should be sought. Therefore, this approach cannot be relied on to achieve the vision of Epping as a sub-District centre.

7.3 Achieving the vision for Epping as a sub-District centre

A non-residential floorspace ratio is considered the most appropriate and effective mechanism to maintain and develop commercial floorspace in the Epping town centre to meet demand over the next 20 years. This would see the development of truly mixed use development which supports the healthy functioning of the centre, providing services for the local and surrounding population, and enable Epping to capitalise on existing and future transport infrastructure as a sub-District centre. A non-residential floorspace in the LEP would also achieve the podium-style development currently required in the two DCPs with the weight of an environmental planning instrument. Maintaining residential development as part of the development is considered appropriate and viable under current market conditions, ensuring residents are located in the centre to activate the Epping town centre outside of work hours.

The appropriate ratio would be set by Council to meet the forecast demand for 55,616 square metres of office floorspace after considering where in Epping commercial floorspace should apply and what uses should be excluded from a minimum non-residential floorspace ratio.

Existing examples of non-residential floorspace ratios in Greater Sydney exclude all residential accommodation, tourist and visitor accommodation, carparks and telecommunications facilities from calculating non-residential floorspace. The exclusion of these uses is largely considered appropriate for Epping. The exclusion of serviced apartments (a form of tourist and visitor accommodation) is considered necessary too as this land use performs a similar role to residential accommodation and would not assist in achieving the strategic vision for the Epping town centre as a sub-District centre.

The location of a non-residential floorspace ratio should be determined by Council considering the most desirable planning and urban design outcomes. The spread of a non-residential floorspace ratio will affect the size of the ratio required to meet forecast need. For instance, a lower ratio would apply across a larger area whereas a non-residential floorspace ratio that only applies to a few lots would need to be higher to achieve 55,616 square metres of office floorspace.

It is SGS' view that a non-residential floorspace ratio should apply on both sides of the rail line to activate both sides of the rail line. It is recognised that some of this potential has been lost with approved development applications on the eastern side including limited commercial floorspace above the ground floor. There may be more potential to provide more commercial floorspace on the western side of the rail line as the lots are generally larger and there is limited approved redevelopment.

A non-residential floorspace should be supported by design controls in the new DCP to achieve a human-scale streetscape and a high quality public domain. It is envisaged that the existing design controls requiring podium style development will continue, providing space for commercial uses mandated in the non-residential floorspace ratio. DCP controls should also stress the need for developments to include flexible floorspace to accommodate businesses of different sizes as they grow and development.

DCP controls should also explore innovative car parking controls to reduce development costs and the impact of cars on the Epping town centre. These controls could include maximum rates for parking or the reduction of minimum car parking rates, and contributions to offsite, centralised car parking supporting several developments. These controls should recognise the Epping town centre's high quality public transport connections and should be developed in accordance with the findings of the Traffic and Transport report prepared as part of the Epping Planning Review.

8 APPENDIX

8.1 Average Retail Turnover Densities – 2016 estimate

	Turnover p/sqm.
Specialty - Other Food	$14,282
Specialty - Other Food	$12,272
Hospitality and Services	$8,152
Specialty - Other Retail	$8,035
Specialty - Clothing and Soft Goods	$5,756
Department Stores	$5,897
Bulky/Household Goods	$5,613

Source: Urbis (2009) with SGS calculations (2017)

8.2 Allocation of commodity expenditure to floorspace typology

	Food & Groceries	Bottleshop/ Tobacco	Restaurants & Cafes & Take-away	Clothing & Shoes	Furniture, Whitegoods, Homeware, Manchester & Electronics	Hardware & Garden	Other Retail	Retail Services
Supermarkets/ Convenience stores	75%	30%						
Specialty - Other Food	25%	70%					10%	
Specialty - Other Food			100%					
Hospitality and Services								
Specialty - Other Retail					10%	10%	80%	70%
Specialty - Clothing and Soft Goods				70%				
Department Stores				30%	45%		10%	30%
Bulky/Household Goods					45%	90%		

8.3 Retail floorspace pipeline

Note: only development applications that include retail floorspace are included in this table.

Address	Stage	Current use	Proposed retail (sqm.)	Retail details
Eastwood				
3-5 Trewlaney Street	Pre construction	Vacant	564	5 tenancies, ground floor
115 Rowe St	DA approved	Carpark	440	Expansion of Eastwood Hotel. comprising bar/dining areas, alfresco dining and seating areas, bar with outdoor gaming) at ground floor
7-9 Rutledge Street	Pre construction	Vacant	960	Ground floor
13-19 Glen Street	DA assessment	single detached houses	800	4 ground level retail tenancies (90sq m to 298sq m)
Total			**2,764**	
Carlingford				
12 James Street	DA approved	Single detached house	12	Part of mixed use development
1-7 Thallon Street	Construction	Vacant site	408	Part of mixed use development
2-8 James Street	Construction	Vacant site	55	Part of mixed use development
10 James Street	Construction	Vacant site	24	Part of mixed use development
Total			**499**	
Epping				
15-17 Essex Street	Construction	Single detached house (3)	210	Part of mixed use development
20-28 Cambridge Street	Construction	Office tower	1,008	Tenancies are all under 100sqm
12-22 Langston Place	DA assessment	Office tower	1,454	Approx. 10 tenancies
2-4 Cambridge Street	DA assessment	Church	1,474	One large tenancies (approx. 1100sqm, marked as commercial, has ground floor access), one smaller tenancy)
Total			**4,146**	

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Prepared for City of Parramatta
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Epping Town Centre

Commercial Floorspace Traffic Study

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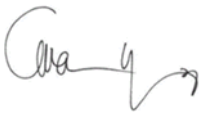

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21 February 2020

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1 Introduction

1.1 Overview

City of Parramatta (the Council) has engaged EMM Consulting to assess and compare operational traffic results for the major road network based on two future (2026) Town Centre land use scenarios. The future base year scenario and two proposed future land use scenarios are summarised as follows. The relevant areas are illustrated in Figure 1.1 for the core Town Centre Study area (in blue) and the surrounding areas (in orange) which are relevant to the assessments in this traffic study report.

Throughout this report, the following terms are used.

- **Authorised development,** includes approved development (and approved development under construction) for the period from 2016 to 2026 in the Town Centre and surrounding areas in accordance with the current floor space ratio (FSR) planning controls. This equates to approximately 2,017 dwellings (refer to Appendix A).

- **Scenario 0 - base case,** authorised development + 12,232 m^2 retail area + 5,504 m^2 commercial office area + a potential 1,742 residential units based on 85 m^2 unit size (for the purpose of comparability between scenarios) under the current development controls. This scenario identifies the likely development patterns in the absence of any changes to development controls.

- **Scenario 1 - future land use with additional commercial development,** authorised development + 12,232 m^2 retail area + 43,551 m^2 commercial office area + a potential 1,310 residential units based on 85 m^2 unit size (for the purpose of comparability between scenarios). No change to current FSR planning controls. This scenario considers the future development pattern if an increase in commercial floorspace displaces some of the residential floorspace.

- **Scenario 2 - future land use with additional commercial development and revised FSR,** authorised development + 12,232 m^2 retail area + 43,551 m^2 commercial office area + a potential 1,808 residential units based on 85 m^2 unit size (for the purpose of comparability between scenarios). This scenario considers the outcome if the commercial component of future development is increased and an increase in FSR is also introduced which will provide for greater commercial development but without any displacement of residential floorspace.

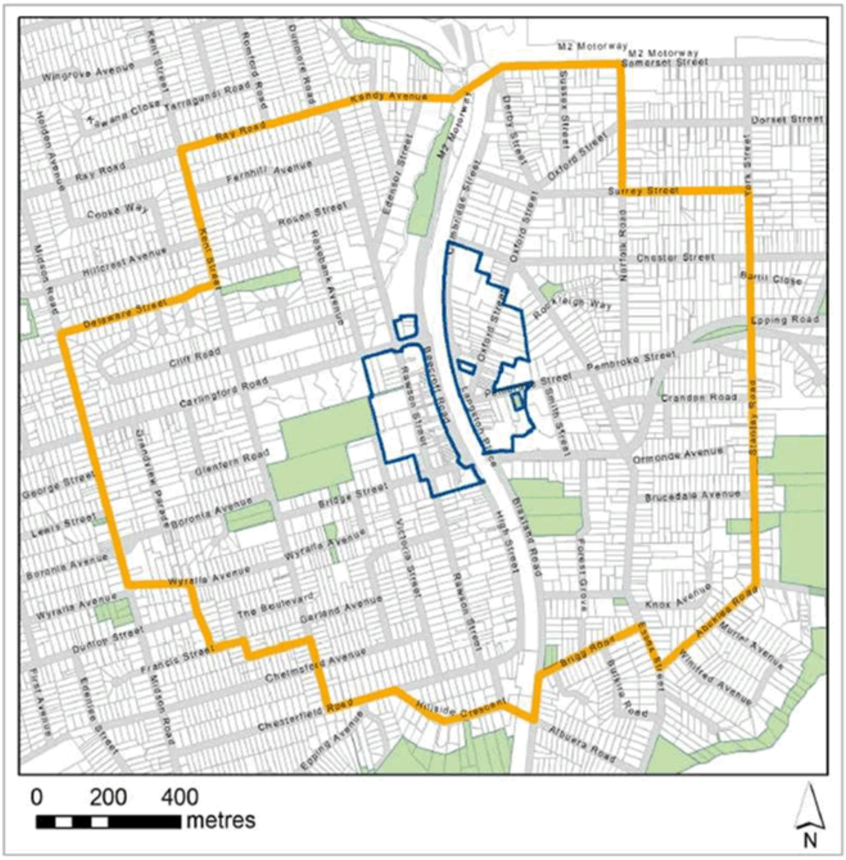

Figure 1.1 Map of the Epping Town Centre and surrounding study areas

1.2 Future base year and proposed future land use scenarios

The Council has provided EMM with a detailed list of properties that are either approved or under construction. These are considered to be 'authorised development' and represent development which is included under all scenarios and summarised at Table 1.1.

The locations of the future study area development sites outside the Town Centre are shown on the map in Appendix A.

The additional Town Centre potential development sites for Scenario 0 (future base year) and Scenario 1 and Scenario 2 (proposed future land uses) are shown in Appendix B.

Table 1.1 Authorised dwelling development within the Town Centre

Property address	Residential Units (@ 85 sqm each)
35 Oxford Street	54
18-28 Cambridge Street	501
30-42 Oxford Street	254
12-22 Langston Place;	464
24-36 Langston Place	101
37-41 Oxford Street	257
48-54 Beecroft Road and 52-54 Rawson Street	130
16-18 Cambridge Street	84
29-33 Oxford Street and 6-14 Cambridge Street (Catholic Church site)	172
Total All Sites	**2,017**

Source: City of Parramatta (2019)

The difference between the scenarios is based on changes to development controls, specifically the allowable commercial area and the FSR.

For the purposes of comparability between the various scenarios, we have assumed a standard residential unit size of 85 m^2 in all tables. Not all residential dwellings will be 85 m^2, but this is considered a reasonable standard for the purposes of this report.

1.2.1 Scenario 0: future base case

Scenario 0 is the base case for 2026, where the majority of authorised and future potential development is residential, with minimal commercial development. The majority of dwellings in the base case 2026 Scenario are located on sites within the core Epping Town Centre study area, which is shown in blue outline in Figure 1.1.

These sites are zoned B2 Local Centre under the Parramatta Local Environmental Plan 2011. These dwellings comprise 2,017 dwellings of 'authorised development' which are listed in Table 1.1, and a further potential 1,742 dwellings which are listed in Table 1.2. A further 1,334 dwellings are distributed in the area outside Epping Town Centre within the orange outline area in Figure 1.1. Under this scenario, there is also approximately 5,504 m2 of office gross floor area.

Table 1.2 Additional development within the Town Centre (Scenario 0)

Property address	Scenario 0	
	Residential Units (85 m^2)	Commercial Office GFA (m^2)
1-3 Oxford Street	0	0
18-24 Oxford Street	67	0
26-28 Oxford Street	34	0
50-50E Rawson Street; part 9 Bridge Street	91	0
41-47 Beecroft Road	99	0

Table 1.2 Additional development within the Town Centre (Scenario 0)

Property address	Scenario 0	
	Residential Units (85 m²)	Commercial Office GFA (m²)
51 Rawson Street	63	3,168
51A Rawson Street	372	0
36-38 Victoria Street	0	0
246-250 Carlingford Road	143	0
74-76 Rawson Street	0	2,336
53-61 Rawson Street	460	0
Lyon Site	413	0
All Sites	**1,742**	**5,504**

Source: City of Parramatta (2019)

1.2.2 Scenarios 1 and 2: Proposed future land use

Scenarios 1 and 2 are development scenarios for 2026. Both Scenarios include authorised development of 2,017 dwellings (listed in Table 1.3 and within the blue outline in Figure 1.1). For both Scenarios, a further 1,334 dwellings are distributed in the area outside Epping Town Centre within the orange outline area in Figure 1.1.

Scenario 1 represents a future potential development within the Epping Town Centre (within the blue outline in Figure 1.1) which assumes the development is:

1) consistent with the maximum floor space ratio controls within the Parramatta Local Environmental Plan (LEP) 2011 and Hornsby LEP 2013; and

2) comprise a minimum of two levels of commercial (office) floorspace within the development.

This totals 1,310 additional dwellings and approximately 43,551 m² of office gross floor area. The sites of potential development are listed in Table 1.3.

Scenario 2 represents a future potential development within the Epping Town Centre (within the blue outline in Figure 1.1) which assumes that development comprises a minimum of 2 levels of commercial (office) floorspace within the development which exceeds the current maximum floor space ratio controls within the Parramatta LEP 2011 and Hornsby LEP 2013. This totals 1,808 additional dwellings and approximately 43,551 m² of office gross floor area. The sites of potential development are listed in Table 1.3.

Table 1.3 Proposed future development within the Town Centre (Scenario 1 and Scenario 2)

Property address	Scenario 1		Scenario 2	
	Residential Units (@ 85 m² each)	Commercial Office GFA (m²)	Residential Units (@ 85 m² each)	Commercial Office GFA (m²)
1-3 Oxford Street	0	0	0	0
18-24 Oxford Street	46	1,888	67	1,888
26-28 Oxford Street	24	960	34	960

Table 1.3 Proposed future development within the Town Centre (Scenario 1 and Scenario 2)

Property address	Scenario 1		Scenario 2	
	Residential Units (@ 85 m² each)	Commercial Office GFA (m²)	Residential Units (@ 85 m² each)	Commercial Office GFA (m²)
50-50E Rawson Street;part 9 Bridge Street	63	2,032	91	2,032
41-47 Beecroft Road	71	2,254	99	2,254
51 Rawson Street	63	3,168	104	3,168
51A Rawson Street	294	6,666	372	6,666
36-38 Victoria Street	0	0	0	0
246-250 Carlingford Road	93	4,816	152	4,816
74-76 Rawson Street	0	2,336	0	2,336
53-61 Rawson Street	339	9,634	460	9,634
Lyon Site	318	9,797	429	9,797
All Sites	**1,310**	**43,551**	**1,808**	**43,551**

Source: City of Parramatta (2019)

1.3 Methodology

EMM Consulting engaged a Transport Modelling Specialist, Paul van Den Bos, to conduct the required major road network and intersection modelling analysis for the base year 2026 (Scenario 0) and the two proposed future 2026 land use scenarios (Scenario 1 and Scenario 2) to identify the additional peak hourly traffic volumes using the road network at each intersection and the mid-block traffic flow speeds and traffic queues (vehicles waiting) between each intersection.

In comparison to the historic Epping Town Centre major road network operations, where the peak period traffic volumes were initially surveyed in 2017 to develop the original baseline traffic network models for this study, a number of recent road network improvements (which have now either been completed since 2017, or their future construction timetable is now known) are included in all the 2026 road network traffic model scenarios which have been analysed. These road network improvements are listed in Table 1.4.

Table 1.4 Summary of committed RMS and Council road improvements

Number	Authority	Proposed road works
1	RMS	Additional capacity at the Beecroft Road and Carlingford Road intersection.
2	RMS	Widening the southern side of Epping Road by about 3.7 metres between Blaxland Road and Essex Street to provide an additional westbound lane.
3	RMS	Widening of railway bridge, additional westbound lane into Beecroft Road.
4	Council/RMS	Signalisation of Kent Street/Carlingford Road intersection.

Two levels of road network traffic modelling have been undertaken for this study using the Dynameq and SIDRA-8 road network and linked intersection traffic models.

Both these models are "mesoscopic" type road network models which take the basic road network output volumes from a regional traffic network model (in this case EMME/2) and use a more detailed "linked intersection" traffic

flow and congestion model to identify specific road network performance outputs (eg travel speed and intersection delays) and the number of vehicles which cannot actually enter the road network when 'gridlock' traffic congestion occurs.

In the case of the Dynameq network model, the model was developed for the morning three-hour peak traffic period only and provided detailed outputs for the following road network operations:

- traffic volume demand, vehicles entering the road network at 15-minute intervals from 6:45 am;
- traffic volume throughput, vehicles exiting the road network at 15-minute intervals from 6:45 am;
- suppressed traffic, vehicles "waiting" to enter the road network at 15-minute intervals from 6:45 am, and
- traffic travel speeds eastbound through the road network at 15-minute intervals from 6:45 am.

In the case of the SIDRA network model, the model was developed for the morning and afternoon one-hour peak traffic periods and provided detailed outputs for the following road network operations for each of the seven major 'traffic signal controlled' intersections along the Epping Town Centre east-west through traffic route:

- overall network traffic volume, level of service and average travel speed;
- intersection peak hourly traffic volume demand and throughput (minus suppressed traffic);
- intersection peak hourly traffic degree of saturation;
- intersection peak hourly average traffic delay (seconds) for all vehicles using the intersection;
- intersection peak hourly level of service within the range ABCDEF which is defined according to RMS standards; and
- maximum peak hour (95th percentile) traffic queue length (metres).

2 Traffic generation assumptions

2.1 Traffic generation rates

Traffic generation assumptions used in this study report are based on the RMS *Guide to Traffic Generating Developments* (RTA 2002) including the Technical Direction (TDT 2013 – 04a) updated surveys of August 2013.

The lowest peak hour vehicle trip generation rates for high density residential flat buildings in metropolitan regional (CBD) centres is now in the range 0.15 to 0.19 per unit. In other more suburban traditional medium density developments, the peak hour vehicle trip ratio is approximately 0.48 trips per unit. Traffic generation rates used in the traffic analysis network model for this study report for residential land use (ie primarily high density residential flat buildings in the core Epping Town centre area) are modified versions of the historic RTA-RMS rates adjusted according to the direct line distance from the Epping train station. They are:

- sector 1: 0 – 200 m to train station;
- sector 2: 200 – 400 m to train station;
- sector 3: 400 – 800 m to train station; and
- sector 4: 800 m or more to train station.

Within the core Epping Town Centre study area, the effective traffic generation rate per 100 sqm gross floor area for residential apartments would be approximately 0.22 AM and 0.18 PM peak hour car trips (Average 0.20).

For the same given amounts of future building gross floor area within the core Epping Town Centre study area (within 200m of the train station) the future commercial office/retail uses will generally have significantly higher car traffic generation rates than for residential uses as follows:

- The highest car traffic generation rates will generally occur with new town centre retail uses which will have approximately 0.80 AM and 2.30 PM peak hour car trips per 100 sqm (Average 1.55) which is approximately 7.75 times higher than for residential uses.
- Mid range traffic generation rates would typically occur for commercial office type uses which would be approximately 0.80 AM and 0.60 PM peak hour car trips per 100 sqm (Average 0.70). This is approximately 3.5 times higher than for residential uses. These rates are significantly lower than the historic standard RTA or RMS traffic generation rates for office development in suburban areas, which are 2.0 vehicle trips per 100 sqm in both the AM and PM peak hours.
- The commercial office traffic generation rates represent 'best practice' highest feasible levels of walking cycling and public transport usage for journeys to work and visitor access and corresponding minimum feasible level of car driver journey to work travel for any areas outside the Sydney CBD, which are currently approximately 25-30% in any comparable area.

The corresponding morning and afternoon peak hour vehicle trips per hour generated by each land use considered in the study for the core Town Centre and surrounding areas, are summarised in Table 2.1.

Table 2.1 Traffic generation rate adopted in the study report

Sector	AM peak traffic generation per unit							PM peak traffic generation per unit						
	Per sector	Residential land use generated traffic ratio		Commercial land use generated traffic ratio		Retail land use generated traffic ratio		Per sector	Residential land use generated traffic ratio		Commercial land use generated traffic ratio		Retail land use generated traffic ratio	
		80% outbound	20% inbound	20% outbound	80% inbound	20% outbound	80% inbound		40% outbound	60% inbound	80% outbound	20% inbound	50% outbound	50% inbound
Sector 1	0.19	0.152	0.06	0.16	0.64	0.16	0.64	0.15	0.06	0.09	0.48	0.12	1.15	1.15
Sector 2	0.23	0.184	0.092					0.23	0.092	0.138				
Sector 3	0.29	0.232	0.116					0.29	0.116	0.174				
Sector 4	0.48	0.384	0.192					0.48	0.192	0.288				

2.2 Traffic distribution pattern

It is assumed in the network traffic model future traffic distributions, particularly for the future commercial centre office and retail land use generated traffic movements, that the majority of the additional future traffic movements will be approaching the Epping Town Centre via the following routes:

- from north of Epping Town Centre: via Kent Street, Ray Road and Rawson Street;
- from west of Epping Town Centre: via Kent Street, Carlingford Road and Bridge Street;
- from south of Epping Town Centre: via Epping Avenue, Chesterfield Road and Rawson Street; and
- from east of Epping Town Centre: via Epping Road, Oxford Road, Pembroke Street, Blaxland Road and Beecroft Road.

These traffic distribution patterns for the additional Epping Town Centre retail and commercial traffic correspond to the existing retail and commercial traffic generation patterns for all sites within the western and the eastern parts of the Epping Town Centre (as divided by the railway line) which are an inbuilt assumption within the current RMS-TfNSW EMME/2 network traffic model.

These traffic distributions as shown in the attached plots in Figure 2.1 and Figure 2.2, show that the majority of the retail and commercial traffic movements which are currently accessing the areas of the Town Centre on each side of the railway line, will predominantly remain on that side of the railway line.

Figure 2.1 Commercial and retail trip origins for Epping Town Centre areas west of the railway line

Figure 2.2 Commercial and retail trip origins for Epping Town Centre areas east of the railway line

3 Future Road Network Operations

3.1 Dynameq network traffic model results

The Dynameq road network model was developed for both the morning and afternoon three-hour traffic peak periods. The detailed network traffic demand inputs and outputs from the source EMME2 model to the Dynameq network model are shown in Appendix C.

The Dynameq road network morning and afternoon peak period traffic demand which is trying to enter the road network is shown for 15-minute intervals in the various output plots in Appendix C, for the three separate 2026 land use scenarios which have been analysed, which are effectively:

- Scenario 0 = +5,093 additional dwellings in 2026, in comparison to the approximate year 2016 baseline traffic model conditions;
- Scenario 1 = +4,661 additional dwellings and +38,047 m^2 additional GFA commercial development floor area in comparison to the approximate year 2016 baseline traffic model conditions, and
- Scenario 2 = +5,159 additional dwellings and +38,047 m^2 additional GFA commercial development floor area in comparison to the approximate year 2016 baseline traffic model conditions.

In terms of the overall road network traffic demand input and output volumes, calculated for 15-minute intervals, the Dynameq traffic model output plots in Appendix C show that the future road network travel conditions will vary significantly within both the three-hour morning and afternoon peak traffic periods, and the levels of road network traffic congestion, travel time delays, and numbers of vehicles waiting to access the road network, will all continue to increase steadily over the full three-hour morning and afternoon peak traffic periods.

The Dynameq traffic delay results are more significant for the morning peak and these results show that in terms of overall traffic volumes entering the road network, the major road network will reach saturation relatively early in the three-hour morning peak period as follows:

- at approximately 7:45 am for the 2026 baseline traffic (Scenario 0);
- at approximately 7:15 am for the 2026 additional development traffic (Scenario 1); and
- at approximately 7:00 am for the 2026 additional development traffic (Scenario 2).

These results confirm the general effect of the additional development traffic which would be generated by the additional Town Centre development land use scenarios (Scenario 1 and Scenario 2), which would effectively cause the onset of peak traffic congestion to occur significantly earlier each morning and with more severe consequences, in terms of traffic movements blocked, in comparison to the assessed year 2026 baseline (Scenario 0) traffic conditions.

In comparison during the afternoon peak traffic period the differences will be much less noticeable in terms of the divergence of the network traffic congestion levels and peak hour traffic speeds for the three Scenarios and there would be generally much lower numbers of vehicles blocked from entering the Epping Town Centre road network, with either the assessed year 2026 baseline (Scenario 0) traffic conditions or the additional Town Centre development land use scenarios (Scenario 1 and Scenario 2).

The overall net effect of the resulting additional road network traffic congestion during the full three-hour morning peak period for the three development traffic scenarios is shown by the final charts of the Dynameq output traffic model results in Appendix C.

These results show the three assessed land use scenarios having overall network travel speeds which continue to decline throughout the three-hour morning peak travel periods and reaching the following respective minimum values at approximately 8:45 am:

- 8 km/h for the 2026 baseline (Scenario 0);
- 3 km/h for the 2026 additional development (Scenario 1); and
- 2 km/h for the 2026 additional development (Scenario 2).

In comparison the results for the three assessed land use scenarios for the three-hour afternoon peak travel periods show much less effect from either development scenario with the overall network travel speeds reaching the following respective minimum values at approximately 4:00 pm:

- 31 km/h for the 2026 baseline (Scenario 0);
- 31 km/h for the 2026 additional development (Scenario 1); and
- 30 km/h for the 2026 additional development (Scenario 2).

3.2 SIDRA network model results

The SIDRA network travel model results, which are included in Appendix D, are based on a one-hour peak period traffic analysis only and show similar trends to the Dynameq travel model results in terms of the overall network traffic operations for the three land use scenarios. In addition to the individual SIDRA intersection performance results for each of the seven major traffic signal-controlled intersections in the study area, the SIDRA network model also determines the overall network performance Level of Service (LOS) and average travel speed for each assessed traffic scenario.

The Epping Town Centre study area SIDRA traffic model shows the overall road network traffic congestion is lower and the network travel speeds are much higher in the afternoon peak hour compared to the morning peak hour. The morning traffic peak period is clearly the more critical of the two peak hour periods for major road intersection delays and other traffic congestion issues for traffic travelling on and traffic requiring access to the major road networks in the Epping Town Centre study area. The overall major road network average travel speeds for each of the assessed traffic scenarios are as follows:

- In the actual morning peak hour, the future overall network travel speeds will reduce from 9.4 km/h for the baseline (Scenario 0) land use to 9.3 km/h and 8.8 km/h with the future land uses of Scenarios 1 and 2.
- The equivalent SIDRA network level travel speed results in the actual afternoon peak hour show the future overall network travel speeds will reduce from 19.3 km/h for the baseline (Scenario 0) land use to 17.8 km/h and 17.4 km/h with the future land uses of Scenarios 1 and 2.

The significance of these overall SIDRA "network performance" travel speed results should also be considered in the context of the additional SIDRA traffic performance results for the seven individual intersections, which are summarised in further detail in Chapters 4, 5 and 6 of this report.

4 Network operational results for base year Scenario 0

The key finding of the 2026 SIDRA base year network model (Scenario 0) is that during the morning peak hour, the overall network performance will be LOS F with an average travel speed 9.4 km/h. The SIDRA intersection results for the future base year 2026 Scenario 0 operations are shown in Table 4.1. Four of the seven key traffic signal-controlled intersections will be operating at LOS F during the morning peak hour.

Table 4.1 Seven key traffic signal-controlled intersections for Scenario 0 during AM peak hour

Intersection	Vehicle demand	Supressed traffic[1]	Degree of saturation (DOS)	Average delay (seconds) (DEL)	Level of service (LOS)
Carlingford Road/Midson Road	2,968	81	1.335	379.8	F
Carlingford Road/Kent Street	2,837	421	0.802	18.2	B
Carlingford Road/Ray Road/Rawson Street	3,386	387	4.802	706.6	F
Carlingford Road/Beecroft Road	4,671	552	1.294	92.1	F
Epping Road/Blaxland Road/Langston Place	4,770	534	1.103	38.6	C
Epping Road/Essex Street	3,720	314	1.127	91.3	F
Epping Road/Pembroke Street	2,953	293	0.879	13.9	A

Note: 1. Hourly volume of suppressed traffic (suppressed at upstream intersections.

In the 2026 afternoon peak hour, the overall baseline network performance will be LOS D with travel speed 19.3 km/h. The SIDRA results for the baseline land use Scenario 0 traffic operations at the seven key traffic signal-controlled intersections are shown in Table 4.2. Only one intersection (Carlingford Road/Beecroft Road) will be operating at LOS F during the afternoon peak hour for Scenario 0.

Table 4.2 Seven key traffic signal-controlled intersections for Scenario 0 during PM peak hour

Intersection	Vehicle demand	Supressed traffic[1]	Degree of saturation (DOS)	Average delay (seconds) (DEL)	Level of service (LOS)
Carlingford Road/Midson Road	2,778	144	0.849	35.1	C
Carlingford Road/Kent Street	2,477	68	0.608	20.1	B
Carlingford Road/Ray Road/Rawson Street	2,815	189	0.901	25.0	B
Carlingford Road/Beecroft Road	4,065	0	2.344	241.6	F
Epping Road/Blaxland Road/Langston Place	4,294	0	1.132	43.3	D
Epping Road/Essex Street	3,266	0	0.931	36.2	C
Epping Road/Pembroke Street	2,302	0	0.907	13.0	A

Note: 1. Hourly volume of suppressed traffic (suppressed at upstream intersections.

The main reason for the better 2026 baseline traffic network performance in the afternoon peak is that the main RMS improvement (the extra lane westbound on the Epping Bridge) will have its greatest benefit in the afternoon peak hour and there will correspondingly be only one intersection operating at LOS F in the afternoon peak hour, at Carlingford Road/Beecroft Road, with an average traffic delay of 241.6 seconds.

This delay will nevertheless cause some afternoon peak hour traffic suppression at the three other downstream intersections for the main (westbound) traffic flow, which are at Carlingford Road/Ray Road/Rawson Street, Carlingford Road/Kent Street and Carlingford Road/Midson Road.

In contrast during the morning traffic peak hour, the much high number of intersections operating at LOS F, with much higher average traffic delays (up to 706.6 seconds) means that there will be more significant morning peak hour traffic suppression at all the major traffic signal controlled intersections in the road network along the main eastbound through traffic route from, Midson Road to Pembroke Street.

5 Network operational results for Scenario 1

The comparative findings of the 2026 SIDRA network model for Scenario 1 are that during the morning peak hour, the overall network performance will also be LOS F and the average travel speed will reduce from 9.4 km/h to 9.3 km/h. The Forecast SIDRA intersection performance for the seven key traffic signal-controlled intersections are shown in Table 5.1. Two intersections will experience a change in level of service, which is shown in **bold**.

Table 5.1 Seven key traffic signal-controlled intersections for Scenario 1 during AM peak hour

Intersection	Vehicle demand	Supressed traffic[1]	Degree of saturation (DOS)	Average delay (seconds) (DEL)	Level of service (LOS)
Carlingford Road/Midson Road	3,034	101	1.229	262.9	F
Carlingford Road/Kent Street	2,888	374	0.858	20.9	B
Carlingford Road/Ray Road/Rawson Street	3,478	355	5.392	765.9	F
Carlingford Road/Beecroft Road	4,698	500	1.383	109.9	F
Epping Road/Blaxland Road/Langston Place	**4,816**	**489**	**1.186**	**45.8**	**D**
Epping Road/Essex Street	3,747	275	1.144	109.0	F
Epping Road/Pembroke Street	**2,963**	**269**	**0.916**	**16.7**	**B**

Note: 1. Hourly volume of suppressed traffic (suppressed at upstream intersections.

In the 2026 afternoon peak hour for Scenario 1, the future network traffic performance will be LOS E with travel speed reduced from 19.3 km/h to 17.8 km/h. The SIDRA results for the 2026 Scenario 1 intersection operations at the seven key traffic signal-controlled intersections which are shown in Table 5.2 show no Intersections will experience any change in the level of service.

Table 5.2 Seven key traffic signal-controlled intersections for Scenario 1 during PM peak hour

Intersection	Vehicle demand	Supressed traffic[1]	Degree of saturation (DOS)	Average delay (seconds) (DEL)	Level of service (LOS)
Carlingford Road/Midson Road	2,796	154	0.859	35.2	C
Carlingford Road/Kent Street	2,503	179	0.607	19.8	B
Carlingford Road/Ray Road/Rawson Street	2,883	204	0.868	26.3	B
Carlingford Road/Beecroft Road	4,094	0	2.567	278.6	F
Epping Road/Blaxland Road/Langston Place	4,325	0	1.264	54.0	D
Epping Road/Essex Street	3,289	0	0.908	36.1	C
Epping Road/Pembroke Street	2,307	0	0.907	12.8	A

Note: 1. Hourly volume of suppressed traffic (suppressed at upstream intersections.

During the future morning peak hour for Scenario 1, two of the seven key traffic signal-controlled intersections will experience a change in the level of service, but this will have only a relatively minor effect on the overall network traffic operations as the respective level of service changes are from C to D at the Epping Road/Blaxland Road/Langston Place intersection and from A to B at the Epping Road and Pembroke Street intersection.

The four existing intersections where the morning peak hour traffic conditions are at LOS F under the year 2026 baseline land use 0 traffic scenario, will remain at LOS F under the year 2026 development land use 1 traffic scenario.

During the future afternoon peak hour for Scenario 1, there will be no change to the level of service operations at any of the seven key traffic signal-controlled intersections.

6 Network operational results for Scenario 2

The year 2026 SIDRA network model results for land use Scenario 2 show that during the morning peak hour, the overall network performance is still LOS F with average travel speed reducing marginally from a baseline of 9.4 km/h to 8.8 km/h. The SIDRA network operations results for the 2026 Scenario 2 traffic delays at the seven key traffic signal-controlled intersections are shown in Table 6.1.Two intersections will experience a change in level of service, which is shown in **bold.**

Table 6.1 Seven key traffic signal-controlled intersections for Scenario 2 during AM peak hour

Intersection	Vehicle demand	Supressed traffic[1]	Degree of saturation (DOS)	Average delay (seconds) (DEL)	Level of service (LOS)
Carlingford Road/Midson Road	3,045	103	1.232	266.4	F
Carlingford Road/Kent Street	2,905	381	0.859	20.5	B
Carlingford Road/Ray Road/Rawson Street	3,526	358	5.647	840.8	F
Carlingford Road/Beecroft Road	4,721	531	1.387	109.5	F
Epping Road/Blaxland Road/Langston Place	**4,840**	**520**	**1.193**	**50.5**	**D**
Epping Road/Essex Street	3,763	295	1.147	111.0	F
Epping Road/Pembroke Street	**2,971**	**287**	**0.916**	**16.7**	**B**

Note: 1. Hourly volume of suppressed traffic (suppressed at upstream intersections.

In the 2026 afternoon peak hour results for Scenario 2, the overall network performance is LOS E with travel speed reducing from a baseline of 19.3 km/h to 17.4 km/h. The SIDRA results at the seven key traffic signal-controlled intersections are shown in Table 6.2. No intersection will experience a change in the level of service.

Table 6.2 Seven key traffic signal-controlled intersections for Scenario 2 during PM peak hour

Intersection	Vehicle demand	Supressed traffic[1]	Degree of saturation (DOS)	Average delay (seconds) (DEL)	Level of service (LOS)
Carlingford Road/Midson Road	2,802	158	0.859	35.2	C
Carlingford Road/Kent Street	2,515	210	0.597	18.8	B
Carlingford Road/Ray Road/Rawson Street	2,910	209	0.876	27.1	B
Carlingford Road/Beecroft Road	4,103	0	2.635	291.1	F
Epping Road/Blaxland Road/Langston Place	4,342	0	1.270	54.7	D
Epping Road/Essex Street	3,298	0	0.885	35.4	C
Epping Road/Pembroke Street	2,310	0	0.907	12.9	A

Note: 1. Hourly volume of suppressed traffic (suppressed at upstream intersections.

Similar to the results for Scenario 1, the year 2026 afternoon peak hour traffic conditions for Scenario 2 will see no change to the level of service operations at any of the seven key traffic signal-controlled intersections considered.

During the future morning peak hours for Scenario 2, two of the seven key traffic signal-controlled intersections will experience a change in the level of service (Similarly to the results for Scenario 1), but this will have only a relatively minor effect on the overall network traffic operations as the respective intersection level of service changes are from LOS C to D at the Epping Road/Blaxland Road/Langston Place intersection and from LOS A to B at the Epping Road and Pembroke Street intersection.

However as four of the existing intersections will have morning peak hour traffic conditions at LOS F under all the three year 2026 land use traffic scenarios considered, it would be appropriate for the Council to seek to minimise the future vehicular traffic generated by future residential or commercial development in the core Epping Town Centre area, during the future morning peak hour traffic periods. The future Town Centre vehicular traffic congestion and accessibility constraints would be less significant during the future afternoon peak hour traffic periods.

7 Comparison and conclusion

In comparison to the base year 2026 traffic conditions for Scenario 0, both the new Commercial + Residential land use scenarios (Scenarios 1 and 2) are showing some increased traffic volumes (and traffic impacts).

However these additional traffic impacts are in most cases relatively minor (in particular for land use Scenario 1) as there will be only minor traffic delay changes at the four existing intersections which will already be operating at highly congested traffic operating conditions during the future year 2026 baseline traffic conditions, during the morning peak hour.

The summary comparison of the future Scenario 1 and Scenario 2 forecast intersection traffic operations relative to Scenario 0 is shown in Table 7.1 for the morning peak hour and in Table 7.2 for the afternoon peak hour. Changes to LOS are shown in **bold** and existing LOS F congested intersection operations are highlighted in grey.

Table 7.1 Comparison of SIDRA traffic impact for various scenarios during the AM peak hour

Intersection	Scenario 0			Scenario 1			Scenario2		
	DOS	DEL	LOS	DOS	DEL	LOS	DOS	DEL	LOS
Carlingford Road/Midson Road	1.335	379.8	F	1.229	262.9	F	1.232	266.4	F
Carlingford Road/Kent Street	0.802	18.2	B	0.858	20.9	B	0.859	20.5	B
Carlingford Road/Ray Road/Rawson Street	4.802	706.6	F	5.392	765.9	F	5.647	840.8	F
Carlingford Road/Beecroft Road	1.294	92.1	F	1.383	109.9	F	1.387	109.5	F
Epping Road/Blaxland Road/Langston Place	1.103	38.6	C	**1.186**	**45.8**	**D**	**1.193**	**50.5**	**D**
Epping Road/Essex Street	1.127	91.3	F	1.144	109.0	F	1.147	111.0	F
Epping Road/Pembroke Street	0.879	13.9	A	**0.916**	**16.7**	**B**	**0.916**	**16.7**	**B**

Note: DOS = Degree of Saturation, DEL = Average Vehicle Delay (seconds), LOS = Level of Service

Table 7.2 Comparison of SIDRA traffic impact for various scenarios during the PM peak hour

Intersection	Scenario 0			Scenario 1			Scenario 2		
	DOS	DEL	LOS	DOS	DEL	LOS	DOS	DEL	LOS
Carlingford Road/Midson Road	0.849	35.1	C	0.859	35.2	C	0.859	35.2	C
Carlingford Road/Kent Street	0.608	20.1	B	0.607	19.8	B	0.597	18.8	B
Carlingford Road/Ray Road/Rawson Street	0.901	25.0	B	0.868	26.3	B	0.876	27.1	B
Carlingford Road/Beecroft Road	2.344	241.6	F	2.567	278.6	F	2.635	291.1	F
Epping Road/Blaxland Road/Langston Place	1.132	43.3	D	1.264	54.0	D	1.270	54.7	D
Epping Road/Essex Street	0.931	36.2	C	0.908	36.1	C	0.885	35.4	C
Epping Road/Pembroke Street	0.907	13.0	A	0.907	12.8	A	0.907	12.9	A

Note: DOS = Degree of Saturation, DEL = Average Vehicle Delay (seconds), LOS = Level of Service

In the morning peak hour, under the future baseline (Scenario 0) traffic conditions, four of the Epping study area intersections will already be operating at highly congested traffic conditions (Level of Service F), in particularly the most congested intersection, which is at Carlingford Road/Ray Road/Rawson Street.

However as this intersection will effectively be operating at delays approximately ten times higher than the specified average traffic delay threshold limit, which is 70 seconds, for LOS F, the effect of the further significant increase in delay by 60 and 135 seconds respectively for Scenario 1 and Scenario 2 may not actually be that noticeable as the future delays will increase from ten to either eleven or twelve times the minimum delay threshold limit for LOS F. Although still a potentially significant delay increase in actual terms, in proportional terms the additional delay increase may not be particularly noticeable to most road users.

However as two of the seven intersections, which are not currently operating at LOS F will also experience changes to the level of service (Epping Road/Blaxland Road/Langston and Epping Road/Pembroke Street) there will effectively be a significant overall worsening of the future baseline traffic conditions and traffic delays at all the assessed future Epping Town Centre intersections for the future increased residential and commercial development scenarios (Scenario 1 and Scenario 2) in comparison to Scenario 0.

In comparison, during the future afternoon peak hour assessed traffic conditions for Scenario 1 and Scenario 2, as summarised in Table 7.2, there will be much less noticeable changes to the future traffic delays at the seven assessed intersections will see no significant material change to the future intersection operations under Scenario 1 and Scenario 2, compared to the future baseline Scenario 0. At the one intersection (Carlingford Road/Beecroft Road) which will be operating at over capacity traffic conditions (LOS F) under the future baseline Scenario 0, there will be further average delay increases of 37 and 49.5 seconds respectively for Scenario 1 and Scenario 2, which may be considered a significant further worsening of the assessed future baseline intersection traffic delay of 241.6 seconds, but this is only a potentially significant impact at one intersection

In general, during the assessed future afternoon peak hour traffic conditions, the overall network travel speeds intersection performance are much better than during the morning peak hour, which is believed to be primarily a result of the assumed future Epping Bridge widening, which is only by a single lane and in the westbound direction only. This assumed future widening will therefore primarily only relieve the existing afternoon peak hour (westbound) traffic delays and will do little to improve the current morning peak hour traffic congestion.

Consequently the future Epping morning peak hour traffic conditions will be much more susceptible and vulnerable to additional traffic delay increases as a result of increased town centre development (either residential, commercial office or retail uses) in comparison to the future Epping afternoon peak hour traffic conditions.

Appendix A

Baseline residential sites

TZ 1403
TZ 1406
Model zone
TZ 1404
TZ 1408
Outside - Productions AM
Outside - Attractions AM
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Appendix B

Proposed commercial site details

BASE CASE - GROUND FLOOR RETAIL -+ RESIDENTIAL TOWER ABOVE

	Address	FSR	HOB	Site Area	Podium Footprint	Retail GFA (35%)	Comm. 2 levels GFA (80%)	Res. Footprint	Storeys	Res. GFA (75%)	Units (85sqm)	Total GFA	FSR	Height [(retail4.5m) + (res storeys x 3.1m)]
A1	1-3 Oxford	4.5	48	990	strata	300								
C1	18-24 Oxford Street	4.5	48	1350	1180	413	0	585	13	5704	67	6117	4.5	44.8
C2	26-28 Oxford Street	4.5	48	700	600	210	0	226	17	2882	34	3092	4.4	57.2
F	[illegible] Street & part 9 [illegible] Street	6	72	1370	1270	445	0	355	29	7721	91	8166	6.0	94.4
I	41-47 Beecroft Road	6	72	1475	1409	493	0	450	25	8438	99	8931	6.1	82
M	51 Rawson Street	4.5	48	2060	1980	693	3168	789	9	5326	63	9187	4.5	39.9
N	51A Rawson Street	4.5	48	7445		2083	0	2220	19	31635	372	33718	4.5	2+ towers
Q	36-38 Victoria Street	4.5	48	4465	strata	0	0			0	0	0		
R	246-250 Carlingford Road	4.5	48	3010	3010	1054	0	955	17	12176	143	13230	4.4	57.2
S	74-76 Rawson St	6	72	4141	strata	1061	2336							
T	53 -61 Rawson Street	4.5	48	9021	6021	2107	0	2745	19	39116	460	41224	4.6	2+ towers
V	Lyon Site	6	72	6584	6123	3674	0	1800	26	35100	413	38774	5.9	2 towers
	Total					12232	5504			148097	1742	162437		

SCENARIO 1 - GROUND FLOOR RETAIL + 2 LEVELS COMMERCIAL IN PODIUM + RESIDENTIAL TOWER

ID	Address	FSR	HOB	Site Area	Podium Footprint	Retail GFA (35%)	Comm. 2 levels GFA (80%)	Res. Footprint	Storeys	Res. GFA (75%)	Units (85sqm)	Total GFA	FSR	Height [(retai/commercial 12m) + (res storeys x 3.1m)]
A1	1-3 Oxford	4.5	48	990	strata	300								
C1	18-24 Oxford Street	4.5	48	1350	1180	413	1888	585	9	3949	46	6250	4.6	39.9
C2	26-28 Oxford Street	4.5	48	700	600	210	960	226	12	2034	24	3204	4.6	49.2
F	59-59E Rawson Street & part 9 Bridge Street	6	72	1370	1270	445	2032	355	20	5325	63	7802	5.7	74
I	41-47 Beecroft Road	6	72	1475	1409	493	2254	450	18	6075	71	8823	6.0	67.8
M	51 Rawson Street	4.5	48	2060	1980	693	3168	789	9	5326	63	9187	4.5	39.9
N	51A Rawson Street	4.5	48	7445		2083	6666	2220	15	24975	294	33724	4.5	2+ towers
Q	36-38 Victoria Street	4.5	48	4465	strata	0	0			0	0	0		
R	246-250 Carlingford Road	4.5	48	3010	3010	1054	4816	955	11	7879	93	13748	4.6	46.1
S	74-76 Rawson St	6	72	4141	strata	1061	2336							
T	53 -61 Rawson Street	4.5	48	9021	6021	2107	9634	2745	14	28823	339	40563	4.5	2+ towers
V	Lyon Site	6	72	6584	6123	3674	9797	1800	20	27000	318	40471	6.1	2 towers
	Total					12232	43551			111385	1310	163771		

SCENARIO 2- GROUND FLOOR RETAIL + 2 LEVELS COMMERCIAL IN PODIUM (not included in FSR) + RESIDENTIAL TOWER

ID	Address	FSR	HOB	Site Area	Podium Footprint	Retail GFA (35%)	Comm. 2 levels GFA (80%)	Res. Footprint	Res storeys if commercial levels are not included in FSR	Res. GFA (75%)	Units (85sqm)	GFA retail + res	FSR retail + res	Total GFA retail + res + comm	FSR retail + res + comm	Height [(retai/commercial 12m) + (res storeys x 3.1m)]	Extra res. storeys required
A1	1-3 Oxford	4.5	48	990	strata	300											
C1	18-24 Oxford Street	4.5	48	1350	1180	413	1888	585	13	5704	67	6117	4.5	8005	5.9	52.3	4
C2	26-28 Oxford Street	4.5	48	700	600	210	960	226	17	2882	34	3092	4.4	4052	5.8	64.7	5
F	50-50E Rawson Street & part 9 Bridge Street	6	72	1370	1270	445	2032	355	29	7721	91	8166	6.0	10198	7.4	101.9	9
I	41-47 Beecroft Road	6	72	1475	1409	493	2254	450	25	8438	99	8931	6.1	11185	7.6	89.5	7
M	51 Rawson Street	4.5	48	2060	1980	693	3168	789	15	8876	104	9569	4.6	12737	6.2	58.5	6
N	51A Rawson Street	4.5	48	7445		2083	6666	2220	19	31635	372	33718	4.5	40384	5.4	2+ towers	4
Q	36-38 Victoria Street	4.5	48	4465	strata	0	0			0	0	0					
R	246-250 Carlingford Road	4.5	48	3010	3010	1054	4816	955	18	12893	152	13946	4.6	18762	6.2	67.8	7
S	74-76 Rawson St	6	72	4141	strata	1061	2336										
T	53 -61 Rawson Street	4.5	48	9021	6021	2107	9634	2745	19	39116	460	41224	4.6	50857	5.6	2+ towers	5
V	Lyon Site	6	72	6584	6123	3674	9797	1800	27	36450	429	40124	6.1	49921	7.6	2 towers	7
	Total					12232	43551			153714	1808			206100			

ALL SCENARIOS EXISTING RETAIL/COMMERCIAL/RESIDENTIAL IN TOWN CENTRE (APPROVED DAs OR DAs UNDER ASSESSMENT)

Site No.	Site	FSR	HOB	Site Area		Proposed /actual retail	Proposed/actual comm	Res. Footprint	Storeys	Res. GFA (75%)	Units (85sqm)	Total GFA	FSR	Height
33	35 Oxford Street	4.5	72			115	0			4259	**54**		**4.5:1**	
35	18-28 Cambridge	4.5	72			1154	0			36259	**501**			
40	30-42 Oxford Street	4.5	48			625	0			22640	**254**			
42	12-22 Langston Place	6	72			1681	0			41394	**464**			
44	24-36 Langston Place	6	72			256	559			7645	**101**			
46	37-41 Oxford Street *	4.5	72			150	1133			21000	**257**			
50	48-54 Beecroft Road & 52-54 Rawson Street **	6	72	2062		1033	0		21	11334	**130**	**12367**	**6:01**	
59	16-18 Cambridge Street	4.5	72	1971		396.93	823.71		22	6,091.00	**84**	**7311.51**	**3.8:1**	**73.83**
60	29-33 Oxford Street & 6-14 Cambridge Street Catholic Church Site					200	0		29	14620	**172**			
	Total					**5611**	**2515.71**				**2017**			

Appendix C

EMME2 and Dynameq network outputs

Dynameq – network characteristics
AM

In Dynameq we need integers to represent vehicles

Mathematics
Imagine 10 trips going to 19 zones: each cell would contain 10/19 = 0.526 trips
If we applied normal rounding – each number in the cell would be rounded up to an integer: 1
In this case each cell would have a "1" and the total for this row = 19 * 1 = 19 (we started with 10 trips)

Mathematically – "before" and "after" totals must be the same
Instead we use "bucket rounding" – so that the total = 10, but some cells have "0" and others have a "1"

Issues of bucket rounding process
Since we do this for 15 minute slices – numbers are multiplied by 4:

- the smallest number in the "hour" matrix is "0" followed by "4"

(The ABS uses something similar and the smallest is "0" and then a "3")

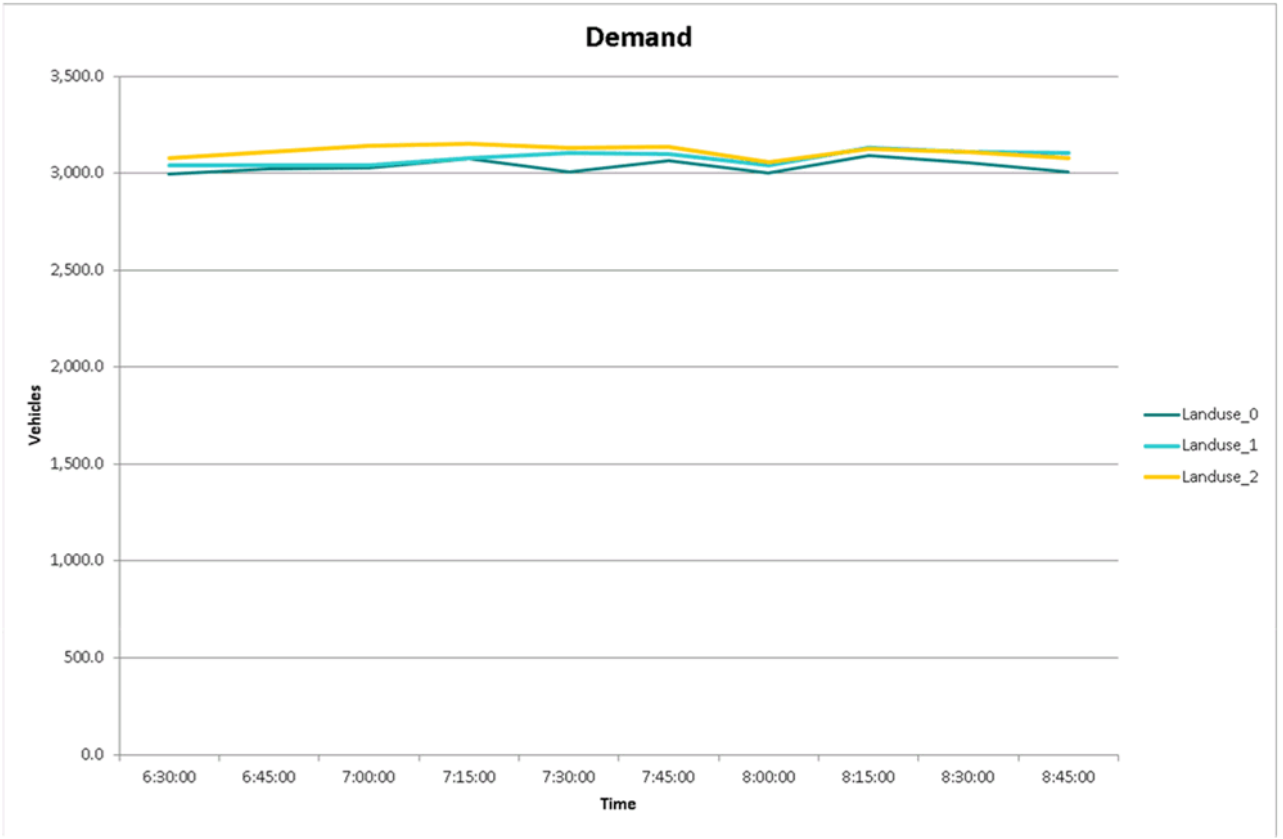
In this study the future travel demand is split into equal 15 minute slices

- the totals are "hourly flows"
- should be uniform for the hour

The "wobbling" in the Demand plot is the result of the background manipulations – nothing too serious!

The tiny kink at 08:00:00 is like to come from the random number generator

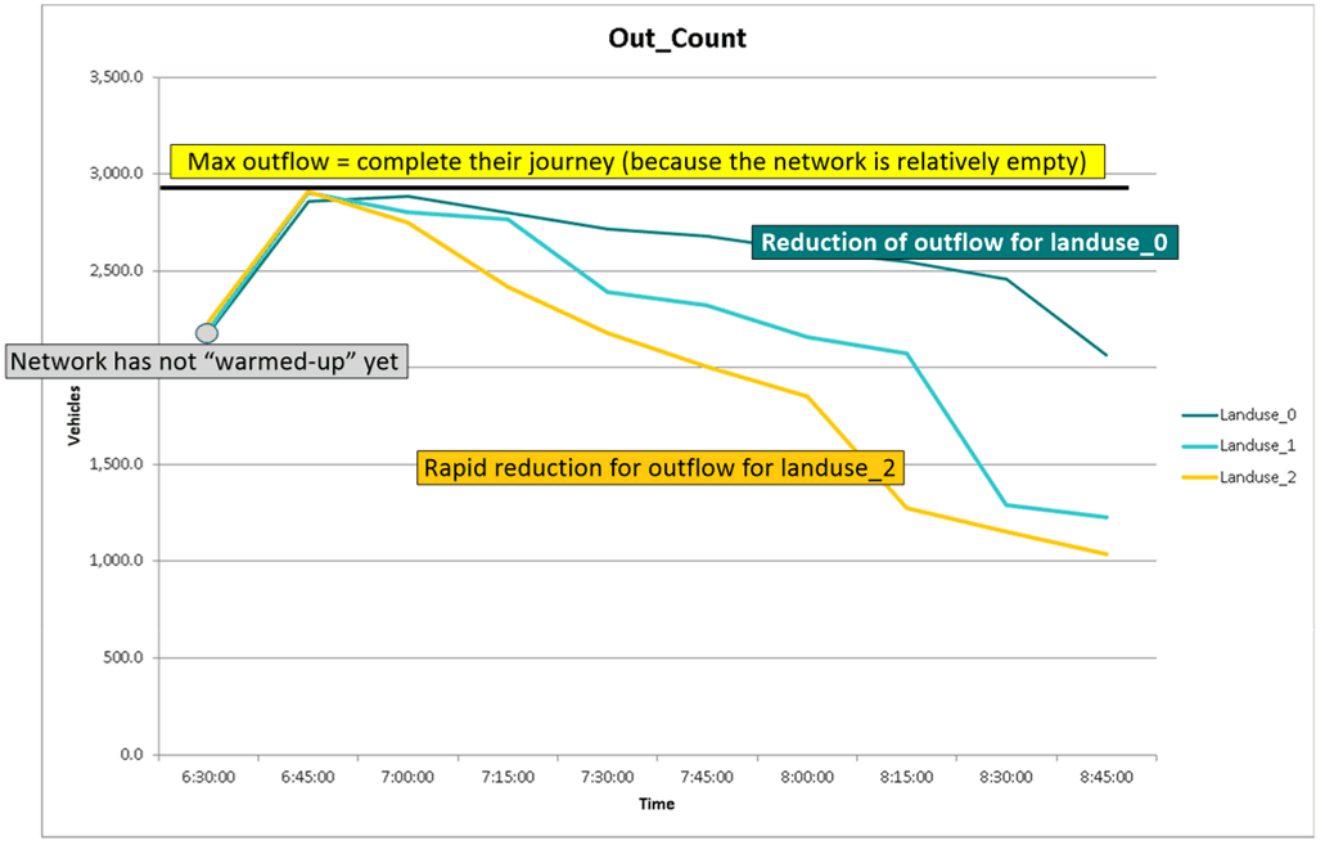
- The random number is used to generate the actual number of vehicles from the chosen probability function

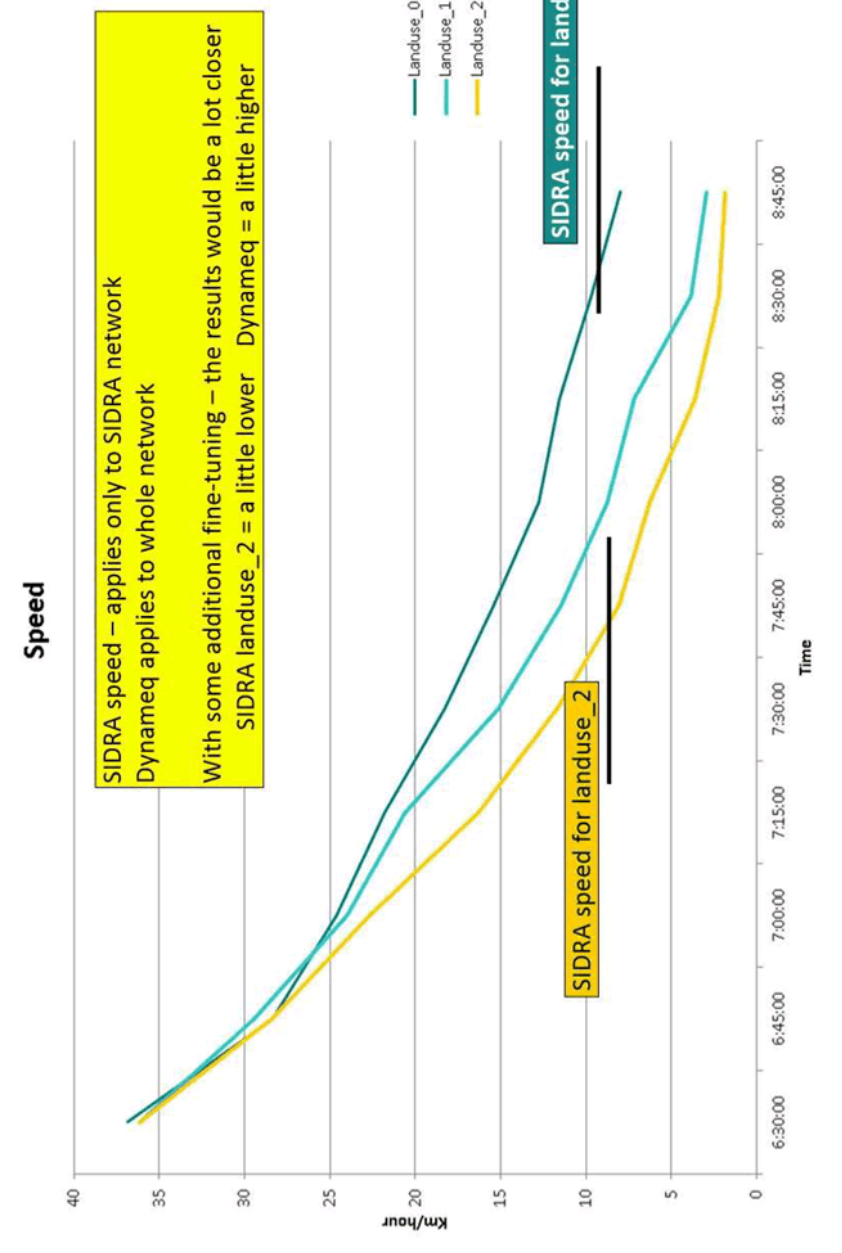

Demand
3,500.0
3,000.0
2,500.0
2,000.0
1,500.0
1,000.0
500.0
0.0
Vehicles
6:30:00
6:45:00
7:00:00
7:15:00
7:30:00
7:45:00
8:00:00
8:15:00
8:30:00
8:45:00
Time
Landuse_0
Landuse_1
Landuse_2

In_Count
Max inflow into network
Slower drop for landuse_0
Drop in inflow
Rapid drop for landuse_2
Landuse_0
Landuse_1
Landuse_2
Vehicles
3,500.0
3,000.0
2,500.0
2,000.0
1,500.0
1,000.0
500.0
0.0
Time
6:30:00
6:45:00
7:00:00
7:15:00
7:30:00
7:45:00
8:00:00
8:15:00
8:30:00
8:45:00

Most of those who start “early” in the first time-slice are able to complete their journey
Those who start “late” in the first time-slice would not reach their end point – they are still travelling
In the next time-slice, the inflow (=same are previous inflow in this case) and outflow are a more valid

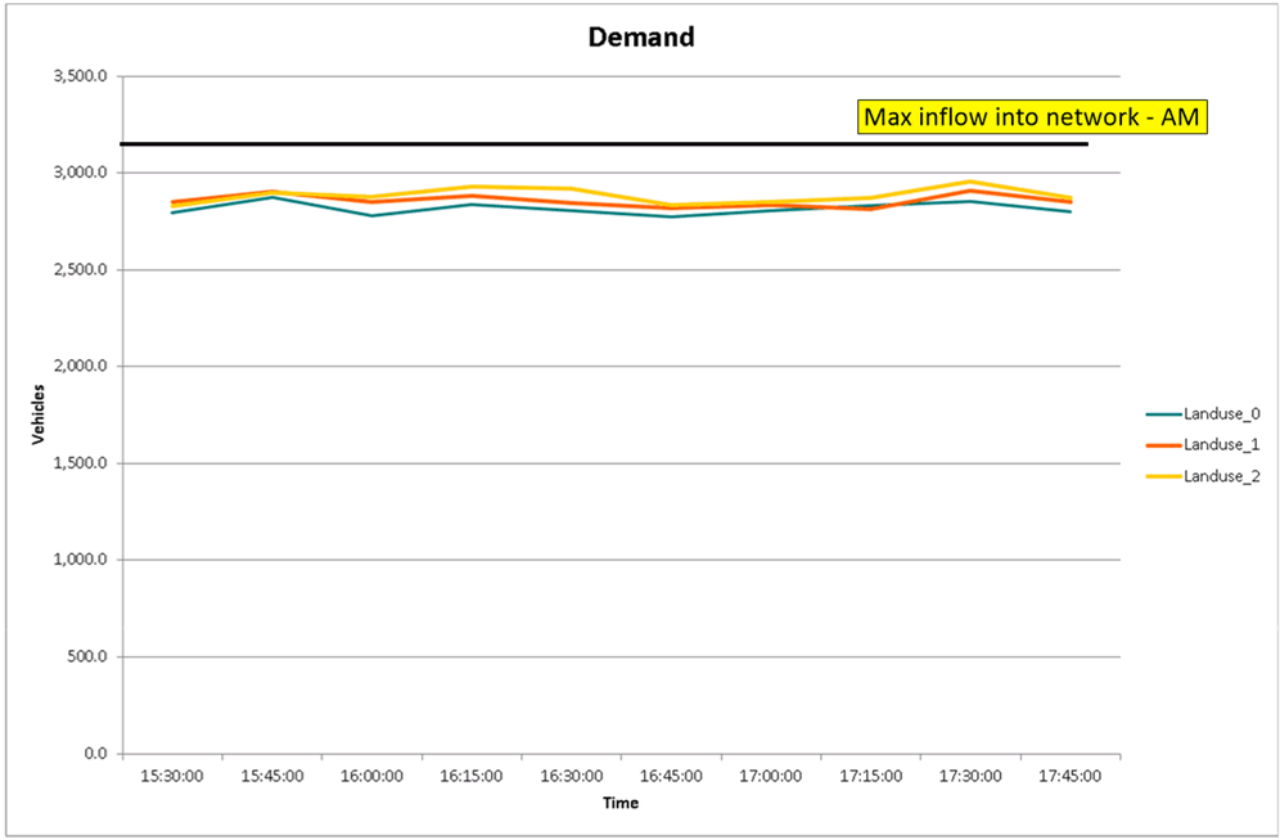
Modellers normally do not show the first point as it only causes confusion
They diplomatically refer to this as point as the “warm-up” period (a science in its own right)

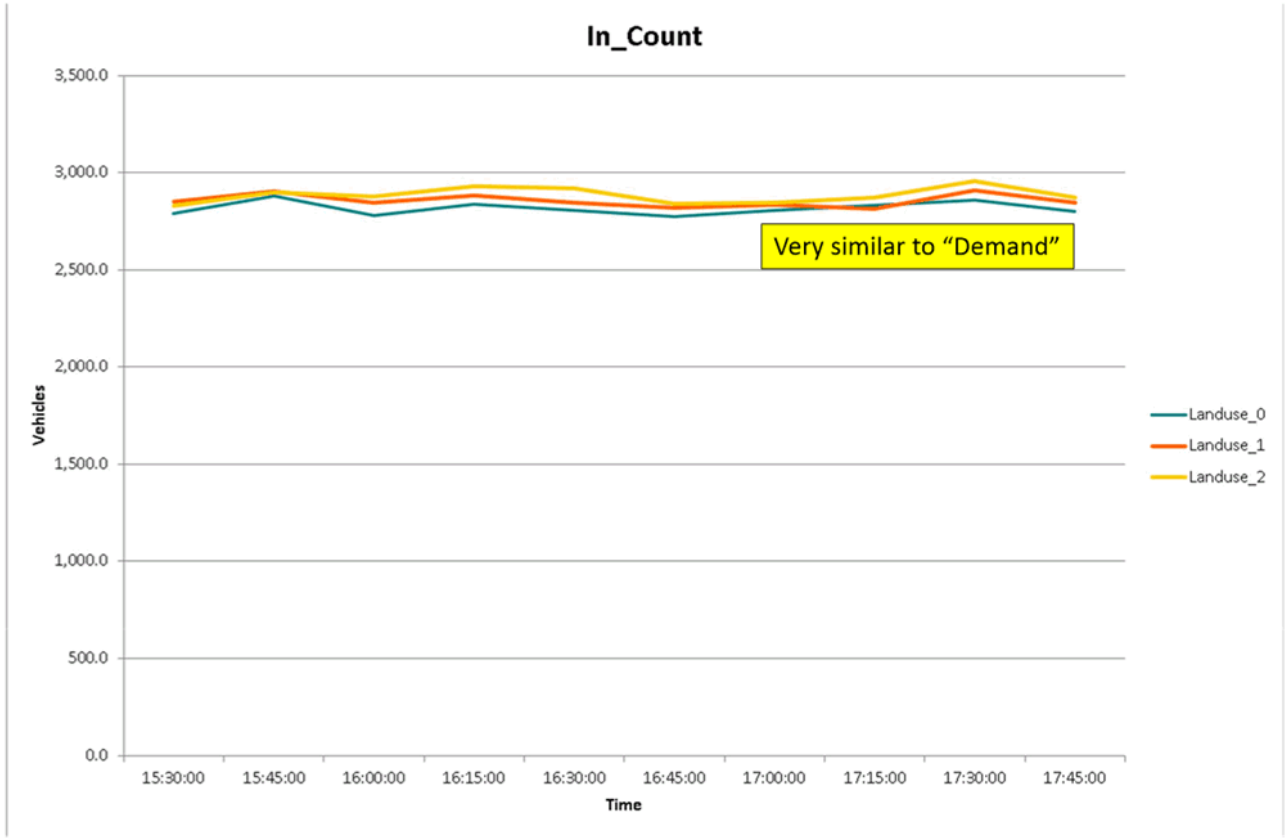

Out_Count
3,500.0
3,000.0
2,500.0
1,500.0
1,000.0
500.0
0.0
Vehicles
Max outflow = complete their journey (because the network is relatively empty)
Reduction of outflow for landuse_0
Network has not "warmed-up" yet
Rapid reduction for outflow for landuse_2
Landuse_0
Landuse_1
Landuse_2
6:30:00
6:45:00
7:00:00
7:15:00
7:30:00
7:45:00
8:00:00
8:15:00
8:30:00
8:45:00
Time


Speed
SIDRA speed – applies only to SIDRA network
Dynameq applies to whole network
With some additional fine-tuning – the results would be a lot closer
SIDRA landuse_2 = a little lower Dynameq = a little higher
Landuse_0
Landuse_1
Landuse_2
SIDRA speed for landuse_0
SIDRA speed for landuse_2
km/hour
Time
40
35
30
25
20
15
10
5
0
6:30:00
6:45:00
7:00:00
7:15:00
7:30:00
7:45:00
8:00:00
8:15:00
8:30:00
8:45:00

The network needs a couple more days for this fine-tuning
This allows the speeds and “suppressed traffic” to be a lot closer

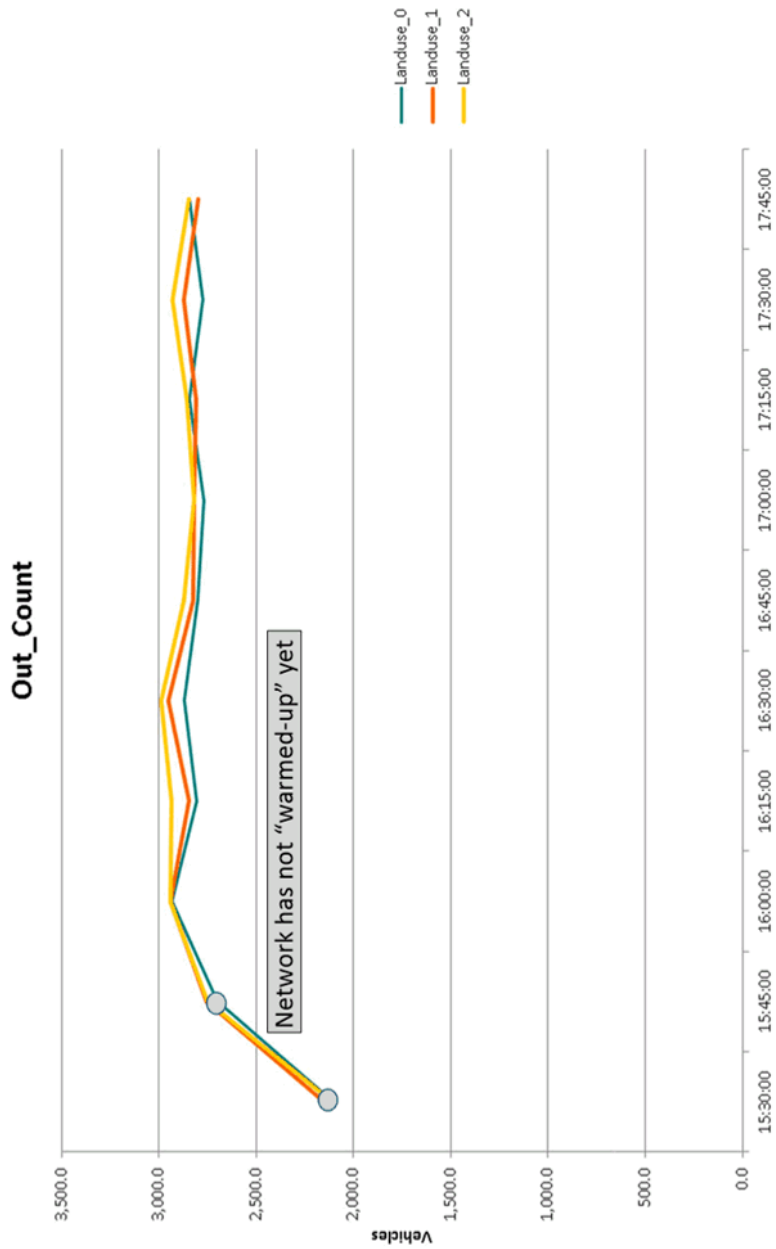
Dynameq – network characteristics
PM

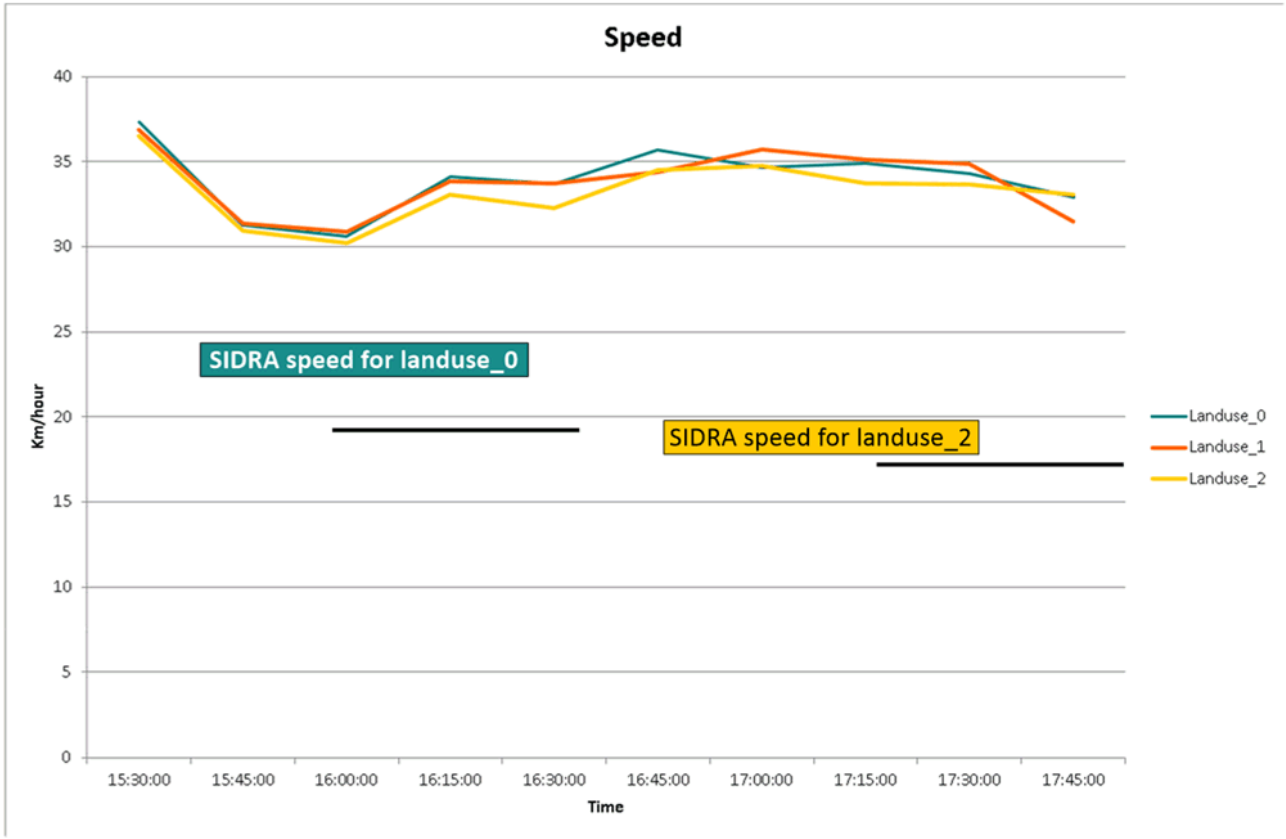

Demand
Max inflow into network - AM
3,500.0
3,000.0
2,500.0
2,000.0
1,500.0
1,000.0
500.0
0.0
Vehicles
15:30:00
15:45:00
16:00:00
16:15:00
16:30:00
16:45:00
17:00:00
17:15:00
17:30:00
17:45:00
Time
Landuse_0
Landuse_1
Landuse_2


In_Count
3,500.0
3,000.0
2,500.0
2,000.0
1,500.0
1,000.0
500.0
0.0
Vehicles
15:30:00
15:45:00
16:00:00
16:15:00
16:30:00
16:45:00
17:00:00
17:15:00
17:30:00
17:45:00
Time
Very similar to “Demand”
Landuse_0
Landuse_1
Landuse_2

When a network is relatively free-flowing – we can observe the impact of impact loading
The first couple of data points shows the “warm-up period
The next couple of points shows the bounce up and then it is “normal”

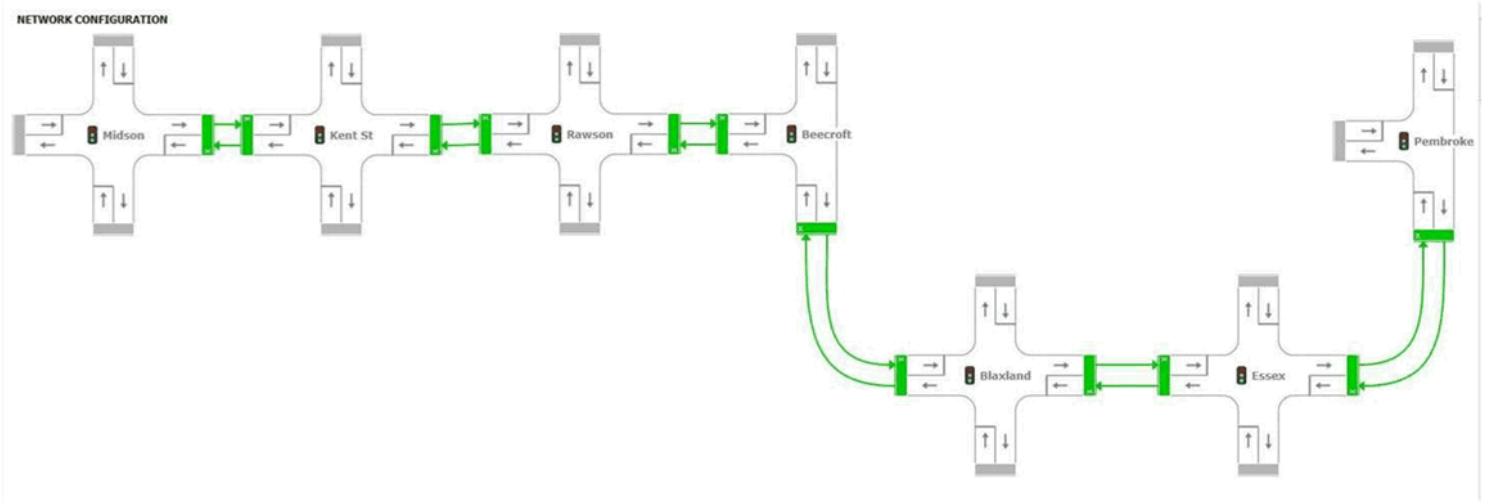
I am not sure why the SIDRA results show such low speeds with a relatively “low” demand
This requires more work on my part


Out_Count
Landuse_0
Landuse_1
Landuse_2
Network has not "warmed-up" yet
Vehicles
3,500.0
3,000.0
2,500.0
2,000.0
1,500.0
1,000.0
500.0
0.0
Time
15:30:00
15:45:00
16:00:00
16:15:00
16:30:00
16:45:00
17:00:00
17:15:00
17:30:00
17:45:00


Speed
40
35
30
25
20
15
10
5
0
Km/hour
SIDRA speed for landuse_0
SIDRA speed for landuse_2
15:30:00
15:45:00
16:00:00
16:15:00
16:30:00
16:45:00
17:00:00
17:15:00
17:30:00
17:45:00
Time
Landuse_0
Landuse_1
Landuse_2

Appendix D

SIDRA network model outputs


NETWORK CONFIGURATION
Midson
Kent St
Rawson
Beecroft
Pembroke
Blaxland
Essex

Summary of overall network performance and SIDRA Intersection Delays (AM Peak Hour)

Intersection	Vehicle Performance	AM Peak hour 2026 Baseline Landuse_0	AM Peak hour 2026 Option Landuse_1	AM Peak hour 2026 Option Landuse_2
Overall Network Performance	LOS and Travel Speed (km/hr)	F 9.4 km/hr	F 9.3 km/hr	F 8.8 km/hr
Carlingford Road and Midson Road	Vehicle Demand Suppressed Traffic D-SAT AV-Delay (secs) LOS	2,968 81 1.335 379.8 F	3,034 101 1.229 262.9 F	3,045 103 1.232 266.4 F
Carlingford Road and Kent Street	Vehicle Demand Suppressed Traffic D-SAT AV-Delay (secs) LOS	2,837 421 0.802 18.2 B	2,888 374 0.858 20.9 B	2,905 381 0.859 20.5 B
Carlingford Road Ray Road and Rawson Street	Vehicle Demand Suppressed Traffic D-SAT AV-Delay (secs) LOS	3,386 387 4.802 706.6 F	3,478 355 5.392 765.9 F	3,526 358 5.647 840.8 F
Carlingford Road and Beecroft Road	Vehicle Demand Suppressed Traffic D-SAT AV-Delay (secs) LOS	4,671 552 1.294 92.1 F	4,698 500 1.383 109.9 F	4,721 531 1.387 109.5 F
Epping Road Blaxland Road and Langston Place	Vehicle Demand Suppressed Traffic D-SAT AV-Delay (secs) LOS	4,770 534 1.103 38.6 C	4,816 489 1.186 45.8 D	4,840 520 1.193 50.5 D
Epping Road and Essex Street	Vehicle Demand Suppressed Traffic D-SAT AV-Delay (secs) LOS	3,720 314 1.127 91.3 F	3,747 275 1.144 109.0 F	3,763 295 1.147 111.0 F
Epping Road and Pembroke Street	Vehicle Demand Suppressed Traffic D-SAT AV-Delay (secs) LOS LOS	2,953 293 0.879 13.9 A	2,963 269 0.916 16.7 B	2,971 287 0.916 16.7 B

Hourly Volume of Suppressed Traffic (Blocked at Upstream Intersections)

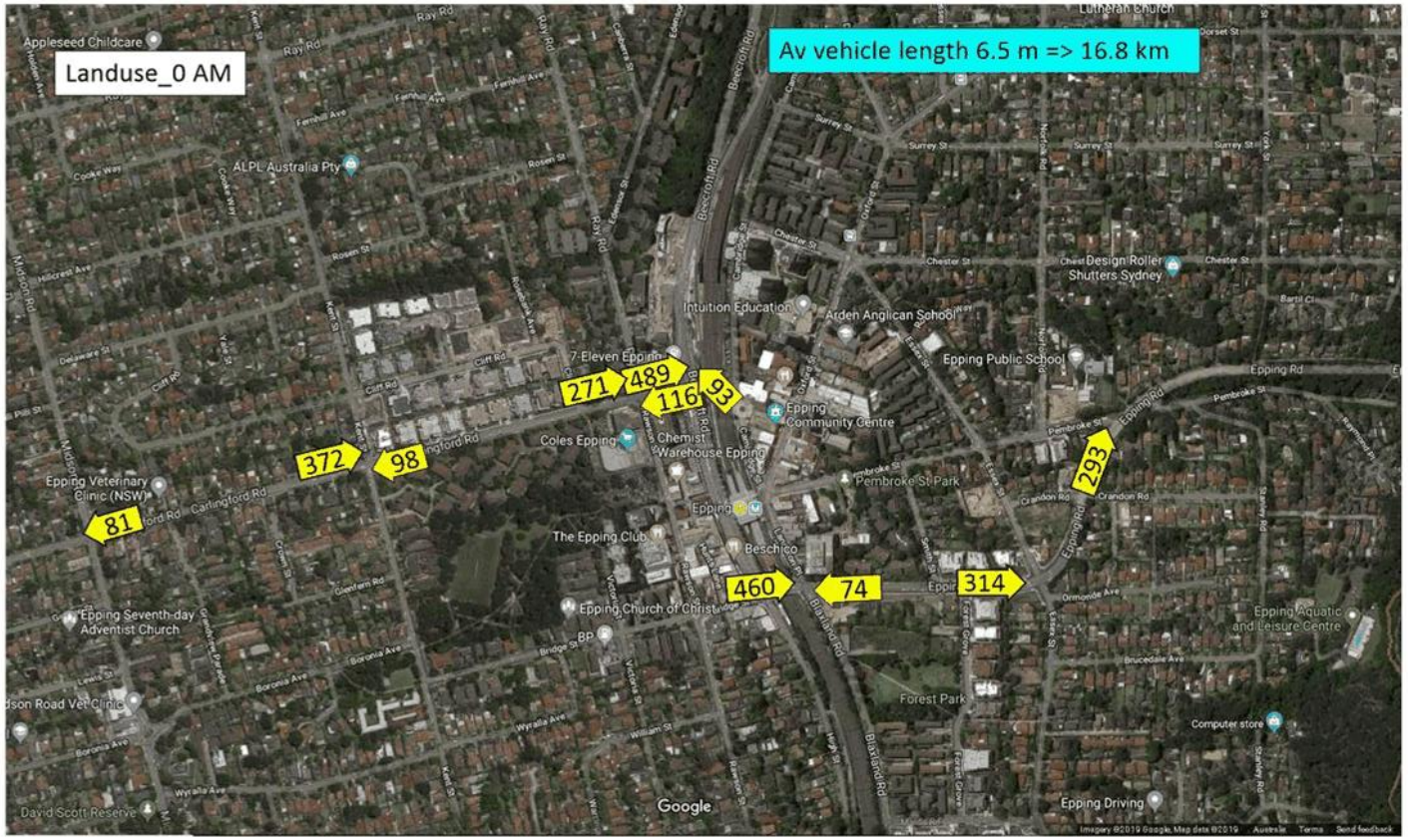
Change in Level of Service Compared to the Base Case

Summary of overall network performance and SIDRA Intersection Delays (PM Peak Hour)

Intersection	Network Performance	PM Peak hour 2026 Baseline Landuse_0	PM Peak hour 2026 Option Landuse_1	PM Peak hour 2026 Option Landuse_2
Overall Network Performance	LOS and Travel Speed (km/hr)	D 19.3 km/hr	E 17.8 km/hr	E 17.4 km/hr
Carlingford Road and Midson Road	Vehicle Demand Suppressed Traffic D-SAT AV-Delay (secs) LOS	2,778 144 0.849 35.1 C	2,796 154 0.859 35.2 C	2,802 158 0.859 35.2 C
Carlingford Road and Kent Street	Vehicle Demand Suppressed Traffic D-SAT AV-Delay (secs) LOS	2,477 68 0.608 20.1 B	2,503 179 0.607 19.8 B	2,515 210 0.597 18.8 B
Carlingford Road Ray Road and Rawson Street	Vehicle Demand Suppressed Traffic D-SAT AV-Delay (secs) LOS	2,815 189 0.901 25.0 B	2,883 204 0.868 26.3 B	2,910 209 0.876 27.1 B
Carlingford Road and Beecroft Road	Vehicle Demand Suppressed Traffic D-SAT AV-Delay (secs) LOS	4,065 0 2.344 241.6 F	4,094 0 2.567 278.6 F	4,103 0 2.635 291.1 F
Epping Road Blaxland Road and Langston Place	Vehicle Demand Suppressed Traffic D-SAT AV-Delay (secs) LOS	4,294 0 1.132 43.3 D	4,325 0 1.264 54.0 D	4,342 0 1.270 54.7 D
Epping Road and Essex Street	Vehicle Demand Suppressed Traffic D-SAT AV-Delay (secs) LOS	3,266 0 0.931 36.2 C	3,289 0 0.908 36.1 C	3,298 0 0.885 35.4 C
Epping Road and Pembroke Street	Vehicle Demand Suppressed Traffic D-SAT AV-Delay (secs) LOS LOS	2,302 0 0.907 13.0 A	2,307 0 0.907 12.8 A	2,310 0 0.907 12.9 A
Hourly Volume of Suppressed Traffic (Blocked at Upstream Intersections)				
Change in Level of Service Compared to the Base Case				

AM SIDRA yellow numbers for Suppressed Traffic at Intersections

= Calculated Total Length of all Intersection Traffic Queues

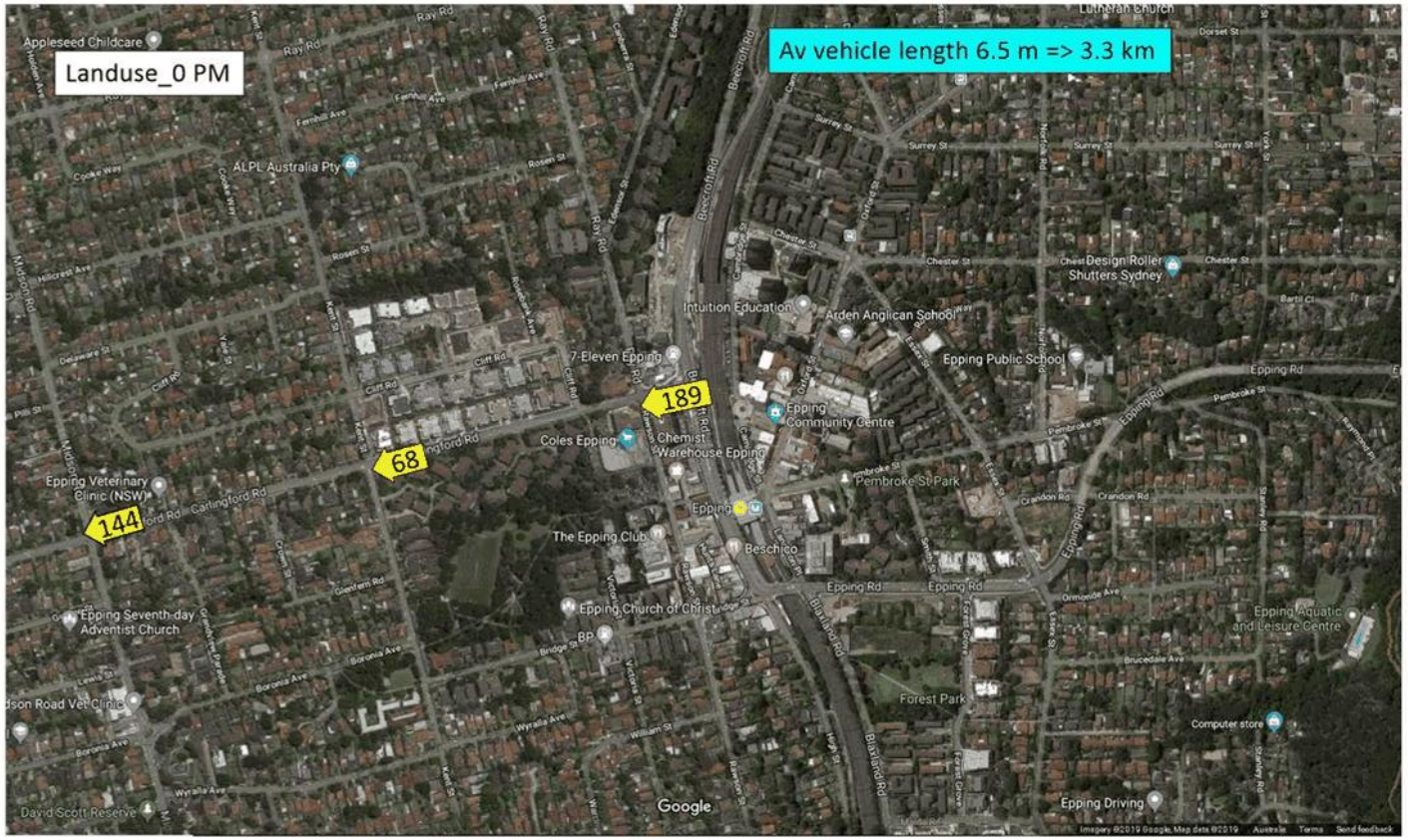

Landuse_0 AM
Av vehicle length 6.5 m => 16.8 km
271
489
116
93
372
98
81
460
74
314
293
Appleseed Childcare
ALPL Australia Pty
Intuition Education
Arden Anglican School
Epping Public School
7-Eleven Epping
Epping Community Centre
Coles Epping
Chemist Warehouse Epping
Epping Veterinary Clinic (NSW)
Pembroke St Park
The Epping Club
Beschico
Epping Church of Christ
BP
Epping Seventh-day Adventist Church
Epping Aquatic and Leisure Centre
Forest Park
Computer store
Epping Driving
David Scott Reserve
Google

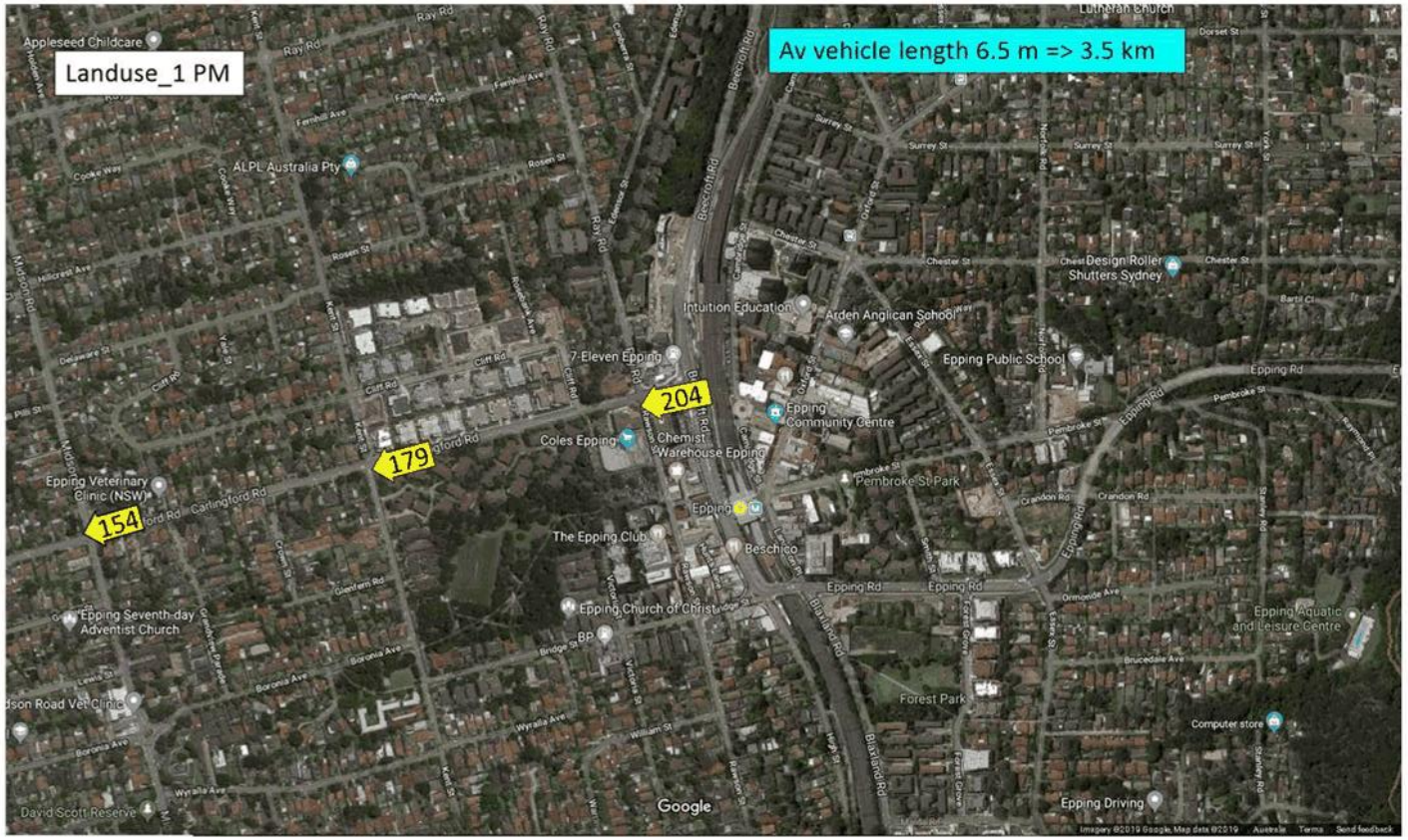
Landuse_1 AM
Av vehicle length 6.5 m => 15.4 km
211
427
114
73
256
118
101
269
402
87
275
Appleseed Childcare
ALPL Australia Pty
Intuition Education
Arden Anglican School
7-Eleven Epping
Epping Public School
Epping Community Centre
Coles Epping
Chemist Warehouse Epping
Epping Veterinary Clinic (NSW)
Pembroke St Park
The Epping Club
Beschico
Epping Church of Christ
Epping Seventh-day Adventist Church
BP
Epping Aquatic and Leisure Centre
Forest Park
Computer store
Epping Driving
David Scott Reserve
Google

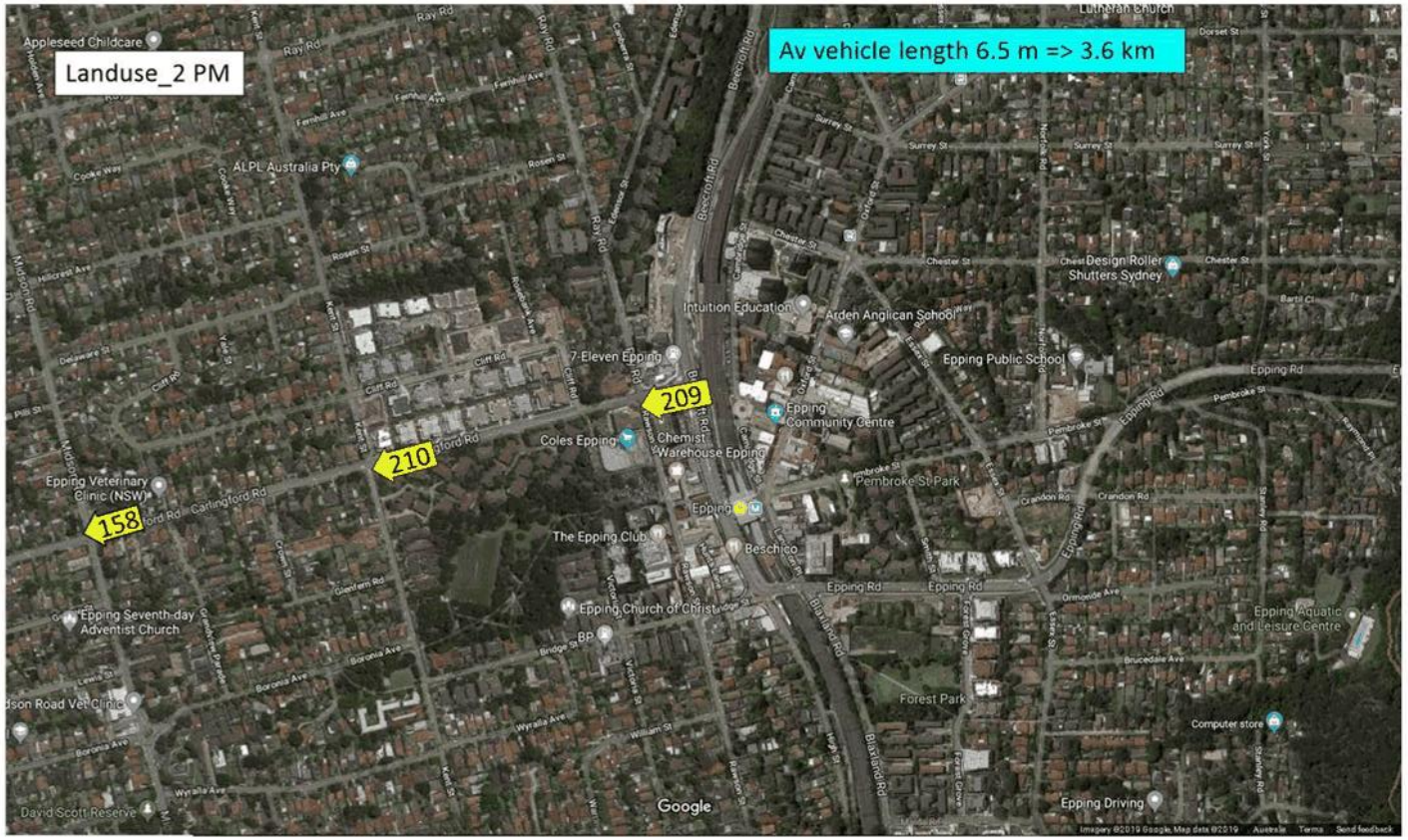
Landuse_2 AM
Av vehicle length 6.5 m => 16.1 km
214
457
144
74
260
171
103
430
90
295
287
Appleseed Childcare
ALPL Australia Pty
Intuition Education
Arden Anglican School
Epping Public School
7-Eleven Epping
Epping Community Centre
Coles Epping
Chemist Warehouse Epping
Epping Veterinary Clinic (NSW)
Pembroke St Park
The Epping Club
Beschico
Epping Church of Christ
Epping Seventh-day Adventist Church
BP
Epping Aquatic and Leisure Centre
Forest Park
Computer store
Epping Driving
David Scott Reserve
Google

PM SIDRA yellow numbers for Suppressed Traffic at Intersections

= Calculated Total Length of all Intersection Traffic Queues


Landuse_0 PM
Av vehicle length 6.5 m => 3.3 km
189
68
144
Appleseed Childcare
ALPL Australia Pty
Intuition Education
Arden Anglican School
7-Eleven Epping
Epping Public School
Epping Community Centre
Coles Epping
Chemist Warehouse Epping
Epping Veterinary Clinic (NSW)
Pembroke St Park
The Epping Club
Beschico
Epping Seventh-day Adventist Church
Epping Church of Christ
BP
Epping Aquatic and Leisure Centre
Forest Park
Computer store
Epping Driving
David Scott Reserve
Google


Landuse_1 PM
Av vehicle length 6.5 m => 3.5 km
204
179
154
Google


Landuse_2 PM
Av vehicle length 6.5 m => 3.6 km
209
210
158
Appleseed Childcare
ALPL Australia Pty
Intuition Education
Arden Anglican School
7-Eleven Epping
Epping Public School
Epping Community Centre
Coles Epping
Chemist Warehouse Epping
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BP
Epping Aquatic and Leisure Centre
Forest Park
Computer store
Epping Driving
David Scott Reserve
Google

NETWORK SUMMARY

Network: N101 [2026_am_landuse_0_AM_signals_only]

2026_am_landuse_0_AM_signals_only
Network Category: (None)
Network Cycle Time = 72 seconds (Network Optimum Cycle Time - Minimum Delay)

Network Performance - Hourly Values

Performance Measure	Vehicles	Per Unit Distance	Pedestrians	Persons
Network Level of Service (LOS)	LOS F			
Travel Time Index	1.50			
Speed Efficiency	0.24			
Congestion Coefficient	4.25			
Travel Speed (Average)	9.4 km/h		2.7 km/h	9.4 km/h
Travel Distance (Total)	13085.8 veh-km/h		10.3 ped-km/h	15713.2 pers-km
Travel Time (Total)	1390.2 veh-h/h		3.8 ped-h/h	1672.1 pers-h/h
Desired Speed	40.0 km/h			
Demand Flows (Total for all Sites)	25305 veh/h		342 ped/h	30708 pers/h
Arrival Flows (Total for all Sites)	22722 veh/h		342 ped/h	27608 pers/h
Demand Flows (Entry Total)	8259 veh/h			
Midblock Inflows (Total)	81 veh/h			
Midblock Outflows (Total)	-302 veh/h			
Percent Heavy Vehicles (Demand)	0.0 %			
Percent Heavy Vehicles (Arrival)	0.0 %			
Degree of Saturation	4.802			
Control Delay (Total)	1152.85 veh-h/h		1.62 ped-h/h	1385.04 pers-h/h
Control Delay (Average)	182.7 sec		17.1 sec	180.6 sec
Control Delay (Worst Lane)	6872.8 sec			
Control Delay (Worst Movement)	6872.8 sec		30.3 sec	6872.8 sec
Geometric Delay (Average)	0.7 sec			
Stop-Line Delay (Average)	182.0 sec			
Queue Storage Ratio (Worst Lane)	1.77			
Total Effective Stops	26783 veh/h		217 ped/h	32357 pers/h
Effective Stop Rate	1.18	2.05 per km	0.63	1.17
Proportion Queued	0.74		0.63	0.82
Performance Index	2359.7		5.0	2364.7
Cost (Total)	46996.61 $/h	3.59 $/km	96.52 $/h	47093.13 $/h
Fuel Consumption (Total)	2660.8 L/h	203.3 mL/km		
Fuel Economy	20.3 L/100km			
Carbon Dioxide (Total)	6252.9 kg/h	477.8 g/km		
Hydrocarbons (Total)	0.666 kg/h	0.051 g/km		
Carbon Monoxide (Total)	5.259 kg/h	0.402 g/km		
NOx (Total)	1.459 kg/h	0.111 g/km		

Network Model Variability Index (Iterations 3 to N): 16.8 %
Number of Iterations: 20 (Maximum: 50)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.8% 0.7% 0.6%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: New South Wales.

Network Performance - Annual Values

Performance Measure	Vehicles	Pedestrians	Persons
Demand Flows (Total for all Sites)	12,146,490 veh/y	164,004 ped/y	14,739,800 pers/y
Delay	553,368 veh-h/y	777 ped-h/y	664,819 pers-h/y
Effective Stops	12,855,960 veh/y	104,087 ped/y	15,531,240 pers/y
Travel Distance	6,281,161 veh-km/y	4,935 ped-km/y	7,542,327 pers-km/y
Travel Time	667,310 veh-h/y	1,832 ped-h/y	802,604 pers-h/y
Cost	22,558,370 $/y	46,330 $/y	22,604,700 $/y
Fuel Consumption	1,277,189 L/y		
Carbon Dioxide	3,001,394 kg/y		
Hydrocarbons	319 kg/y		
Carbon Monoxide	2,524 kg/y		
NOx	700 kg/y		

NETWORK SUMMARY

Network: N101 [2026_am_landuse_0_PM_signals_only]

2026_am_landuse_0_PM_signals_only
Network Category: (None)
Network Cycle Time = 110 seconds (Network Optimum Cycle Time - Minimum Delay)

Network Performance - Hourly Values

Performance Measure	Vehicles	Per Unit Distance	Pedestrians	Persons
Network Level of Service (LOS)	LOS E			
Travel Time Index	4.26			
Speed Efficiency	0.48			
Congestion Coefficient	2.07			
Travel Speed (Average)	19.3 km/h		2.3 km/h	19.2 km/h
Travel Distance (Total)	12313.2 veh-km/h		10.3 ped-km/h	14786.2 pers-km
Travel Time (Total)	637.4 veh-h/h		4.5 ped-h/h	769.4 pers-h/h
Desired Speed	40.0 km/h			
Demand Flows (Total for all Sites)	21997 veh/h		342 ped/h	26738 pers/h
Arrival Flows (Total for all Sites)	21496 veh/h		342 ped/h	26137 pers/h
Demand Flows (Entry Total)	7436 veh/h			
Midblock Inflows (Total)	124 veh/h			
Midblock Outflows (Total)	-500 veh/h			
Percent Heavy Vehicles (Demand)	0.0 %			
Percent Heavy Vehicles (Arrival)	0.0 %			
Degree of Saturation	2.344			
Control Delay (Total)	422.68 veh-h/h		2.32 ped-h/h	509.54 pers-h/h
Control Delay (Average)	70.8 sec		24.5 sec	70.2 sec
Control Delay (Worst Lane)	2485.2 sec			
Control Delay (Worst Movement)	2485.2 sec		49.3 sec	2485.2 sec
Geometric Delay (Average)	0.7 sec			
Stop-Line Delay (Average)	70.1 sec			
Queue Storage Ratio (Worst Lane)	1.00			
Total Effective Stops	15805 veh/h		199 ped/h	19165 pers/h
Effective Stop Rate	0.74	1.28 per km	0.58	0.73
Proportion Queued	0.71		0.58	0.72
Performance Index	1254.0		5.6	1259.6
Cost (Total)	22071.26 $/h	1.79 $/km	114.40 $/h	22185.66 $/h
Fuel Consumption (Total)	1631.6 L/h	132.5 mL/km		
Fuel Economy	13.3 L/100km			
Carbon Dioxide (Total)	3834.4 kg/h	311.4 g/km		
Hydrocarbons (Total)	0.379 kg/h	0.031 g/km		
Carbon Monoxide (Total)	3.773 kg/h	0.306 g/km		
NOx (Total)	1.056 kg/h	0.086 g/km		

Network Model Variability Index (Iterations 3 to N): 9.2 %
Number of Iterations: 18 (Maximum: 50)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.9% 0.5% 0.2%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: New South Wales.

Network Performance - Annual Values

Performance Measure	Vehicles	Pedestrians	Persons
Demand Flows (Total for all Sites)	10,558,640 veh/y	164,004 ped/y	12,834,380 pers/y
Delay	202,885 veh-h/y	1,115 ped-h/y	244,578 pers-h/y
Effective Stops	7,586,501 veh/y	95,326 ped/y	9,199,128 pers/y
Travel Distance	5,910,355 veh-km/y	4,935 ped-km/y	7,097,361 pers-km/y
Travel Time	305,950 veh-h/y	2,170 ped-h/y	369,310 pers-h/y
Cost	10,594,210 $/y	54,912 $/y	10,649,120 $/y
Fuel Consumption	783,191 L/y		
Carbon Dioxide	1,840,498 kg/y		
Hydrocarbons	182 kg/y		
Carbon Monoxide	1,811 kg/y		
NOx	507 kg/y		

NETWORK SUMMARY

Network: N101 [2026_am_landuse_1_AM_signals_only]

2026_am_landuse_1_AM_signals_only
Network Category: (None)
Network Cycle Time = 75 seconds (Network Optimum Cycle Time - Minimum Delay)

Network Performance - Hourly Values

Performance Measure	Vehicles	Per Unit Distance	Pedestrians	Persons
Network Level of Service (LOS)	LOS F			
Travel Time Index	1.48			
Speed Efficiency	0.23			
Congestion Coefficient	4.28			
Travel Speed (Average)	9.3 km/h		2.7 km/h	9.3 km/h
Travel Distance (Total)	13392.0 veh-km/h		10.3 ped-km/h	16080.7 pers-km
Travel Time (Total)	1434.6 veh-h/h		3.9 ped-h/h	1725.4 pers-h/h
Desired Speed	40.0 km/h			
Demand Flows (Total for all Sites)	25624 veh/h		342 ped/h	31090 pers/h
Arrival Flows (Total for all Sites)	23259 veh/h		342 ped/h	28253 pers/h
Demand Flows (Entry Total)	8416 veh/h			
Midblock Inflows (Total)	87 veh/h			
Midblock Outflows (Total)	-318 veh/h			
Percent Heavy Vehicles (Demand)	0.0 %			
Percent Heavy Vehicles (Arrival)	0.0 %			
Degree of Saturation	5.392			
Control Delay (Total)	1193.86 veh-h/h		1.68 ped-h/h	1434.31 pers-h/h
Control Delay (Average)	184.8 sec		17.7 sec	182.8 sec
Control Delay (Worst Lane)	7928.6 sec			
Control Delay (Worst Movement)	7928.6 sec		31.8 sec	7928.6 sec
Geometric Delay (Average)	0.7 sec			
Stop-Line Delay (Average)	184.1 sec			
Queue Storage Ratio (Worst Lane)	1.73			
Total Effective Stops	26634 veh/h		215 ped/h	32176 pers/h
Effective Stop Rate	1.15	1.99 per km	0.63	1.14
Proportion Queued	0.74		0.63	0.82
Performance Index	2447.1		5.1	2452.2
Cost (Total)	48503.46 $/h	3.62 $/km	97.95 $/h	48601.41 $/h
Fuel Consumption (Total)	2735.5 L/h	204.3 mL/km		
Fuel Economy	20.4 L/100km			
Carbon Dioxide (Total)	6428.4 kg/h	480.0 g/km		
Hydrocarbons (Total)	0.685 kg/h	0.051 g/km		
Carbon Monoxide (Total)	5.398 kg/h	0.403 g/km		
NOx (Total)	1.491 kg/h	0.111 g/km		

Network Model Variability Index (Iterations 3 to N): 30.2 %
Number of Iterations: 17 (Maximum: 50)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.9% 0.7% 0.6%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: New South Wales.

Network Performance - Annual Values

Performance Measure	Vehicles	Pedestrians	Persons
Demand Flows (Total for all Sites)	12,299,350 veh/y	164,004 ped/y	14,923,220 pers/y
Delay	573,053 veh-h/y	804 ped-h/y	688,468 pers-h/y
Effective Stops	12,784,550 veh/y	103,083 ped/y	15,444,550 pers/y
Travel Distance	6,428,169 veh-km/y	4,935 ped-km/y	7,718,738 pers-km/y
Travel Time	688,599 veh-h/y	1,859 ped-h/y	828,178 pers-h/y
Cost	23,281,660 $/y	47,015 $/y	23,328,680 $/y
Fuel Consumption	1,313,032 L/y		
Carbon Dioxide	3,085,625 kg/y		
Hydrocarbons	329 kg/y		
Carbon Monoxide	2,591 kg/y		
NOx	716 kg/y		

NETWORK SUMMARY

Network: N101 [2026_am_landuse_0_PM_signals_only]

2026_am_landuse_0_PM_signals_only
Network Category: (None)
Network Cycle Time = 110 seconds (Network Optimum Cycle Time - Minimum Delay)

Network Performance - Hourly Values

Performance Measure	Vehicles	Per Unit Distance	Pedestrians	Persons
Network Level of Service (LOS)	LOS E			
Travel Time Index	3.83			
Speed Efficiency	0.44			
Congestion Coefficient	2.25			
Travel Speed (Average)	17.8 km/h		2.3 km/h	17.7 km/h
Travel Distance (Total)	12420.1 veh-km/h		10.3 ped-km/h	14914.4 pers-km
Travel Time (Total)	698.2 veh-h/h		4.5 ped-h/h	842.3 pers-h/h
Desired Speed	40.0 km/h			
Demand Flows (Total for all Sites)	22197 veh/h		342 ped/h	26978 pers/h
Arrival Flows (Total for all Sites)	21659 veh/h		342 ped/h	26333 pers/h
Demand Flows (Entry Total)	7528 veh/h			
Midblock Inflows (Total)	126 veh/h			
Midblock Outflows (Total)	-510 veh/h			
Percent Heavy Vehicles (Demand)	0.0 %			
Percent Heavy Vehicles (Arrival)	0.0 %			
Degree of Saturation	2.567			
Control Delay (Total)	481.11 veh-h/h		2.33 ped-h/h	579.65 pers-h/h
Control Delay (Average)	80.0 sec		24.5 sec	79.2 sec
Control Delay (Worst Lane)	2884.6 sec			
Control Delay (Worst Movement)	2884.6 sec		49.3 sec	2884.6 sec
Geometric Delay (Average)	0.7 sec			
Stop-Line Delay (Average)	79.3 sec			
Queue Storage Ratio (Worst Lane)	1.00			
Total Effective Stops	16126 veh/h		199 ped/h	19550 pers/h
Effective Stop Rate	0.74	1.30 per km	0.58	0.74
Proportion Queued	0.70		0.58	0.72
Performance Index	1329.5		5.6	1335.2
Cost (Total)	24075.14 $/h	1.94 $/km	114.48 $/h	24189.63 $/h
Fuel Consumption (Total)	1713.1 L/h	137.9 mL/km		
Fuel Economy	13.8 L/100km			
Carbon Dioxide (Total)	4025.8 kg/h	324.1 g/km		
Hydrocarbons (Total)	0.401 kg/h	0.032 g/km		
Carbon Monoxide (Total)	3.894 kg/h	0.314 g/km		
NOx (Total)	1.083 kg/h	0.087 g/km		

Network Model Variability Index (Iterations 3 to N): 7.9 %
Number of Iterations: 22 (Maximum: 50)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.6% 0.5% 0.3%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: New South Wales.

Network Performance - Annual Values

Performance Measure	Vehicles	Pedestrians	Persons
Demand Flows (Total for all Sites)	10,654,530 veh/y	164,004 ped/y	12,949,440 pers/y
Delay	230,931 veh-h/y	1,117 ped-h/y	278,234 pers-h/y
Effective Stops	7,740,514 veh/y	95,473 ped/y	9,384,089 pers/y
Travel Distance	5,961,651 veh-km/y	4,935 ped-km/y	7,158,917 pers-km/y
Travel Time	335,119 veh-h/y	2,171 ped-h/y	404,314 pers-h/y
Cost	11,556,070 $/y	54,951 $/y	11,611,020 $/y
Fuel Consumption	822,282 L/y		
Carbon Dioxide	1,932,362 kg/y		
Hydrocarbons	193 kg/y		
Carbon Monoxide	1,869 kg/y		
NOx	520 kg/y		

NETWORK SUMMARY

Network: N101 [2026_am_landuse_2_AM_signals_only]

2026_am_landuse_2_AM_signals_only
Network Category: (None)
Network Cycle Time = 75 seconds (Network Optimum Cycle Time - Minimum Delay)

Network Performance - Hourly Values

Performance Measure	Vehicles	Per Unit Distance	Pedestrians	Persons
Network Level of Service (LOS)	LOS F			
Travel Time Index	1.34			
Speed Efficiency	0.22			
Congestion Coefficient	4.53			
Travel Speed (Average)	8.8 km/h		2.7 km/h	8.8 km/h
Travel Distance (Total)	13424.7 veh-km/h		10.3 ped-km/h	16120.0 pers-km
Travel Time (Total)	1521.1 veh-h/h		3.9 ped-h/h	1829.2 pers-h/h
Desired Speed	40.0 km/h			
Demand Flows (Total for all Sites)	25770 veh/h		342 ped/h	31266 pers/h
Arrival Flows (Total for all Sites)	23295 veh/h		342 ped/h	28296 pers/h
Demand Flows (Entry Total)	8469 veh/h			
Midblock Inflows (Total)	88 veh/h			
Midblock Outflows (Total)	-320 veh/h			
Percent Heavy Vehicles (Demand)	0.0 %			
Percent Heavy Vehicles (Arrival)	0.0 %			
Degree of Saturation	5.647			
Control Delay (Total)	1279.46 veh-h/h		1.67 ped-h/h	1537.02 pers-h/h
Control Delay (Average)	197.7 sec		17.6 sec	195.6 sec
Control Delay (Worst Lane)	8389.2 sec			
Control Delay (Worst Movement)	8389.2 sec		31.8 sec	8389.2 sec
Geometric Delay (Average)	0.7 sec			
Stop-Line Delay (Average)	197.0 sec			
Queue Storage Ratio (Worst Lane)	1.83			
Total Effective Stops	27147 veh/h		214 ped/h	32791 pers/h
Effective Stop Rate	1.17	2.02 per km	0.63	1.16
Proportion Queued	0.75		0.63	0.82
Performance Index	2558.6		5.1	2563.7
Cost (Total)	51334.01 $/h	3.82 $/km	97.83 $/h	51431.85 $/h
Fuel Consumption (Total)	2845.5 L/h	212.0 mL/km		
Fuel Economy	21.2 L/100km			
Carbon Dioxide (Total)	6686.9 kg/h	498.1 g/km		
Hydrocarbons (Total)	0.715 kg/h	0.053 g/km		
Carbon Monoxide (Total)	5.554 kg/h	0.414 g/km		
NOx (Total)	1.527 kg/h	0.114 g/km		

Network Model Variability Index (Iterations 3 to N): 32.4 %
Number of Iterations: 36 (Maximum: 50)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.3% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: New South Wales.

Network Performance - Annual Values

Performance Measure	Vehicles	Pedestrians	Persons
Demand Flows (Total for all Sites)	12,369,760 veh/y	164,004 ped/y	15,007,710 pers/y
Delay	614,140 veh-h/y	802 ped-h/y	737,770 pers-h/y
Effective Stops	13,030,450 veh/y	102,898 ped/y	15,739,440 pers/y
Travel Distance	6,443,876 veh-km/y	4,935 ped-km/y	7,737,586 pers-km/y
Travel Time	730,142 veh-h/y	1,857 ped-h/y	878,027 pers-h/y
Cost	24,640,330 $/y	46,961 $/y	24,687,290 $/y
Fuel Consumption	1,365,836 L/y		
Carbon Dioxide	3,209,715 kg/y		
Hydrocarbons	343 kg/y		
Carbon Monoxide	2,666 kg/y		
NOx	733 kg/y		

NETWORK SUMMARY

Network: N101 [2026_am_landuse_2_PM_signals_only]

2026_am_landuse_2_PM_signals_only
Network Category: (None)
Network Cycle Time = 110 seconds (Network Optimum Cycle Time - Minimum Delay)

Network Performance - Hourly Values								
Performance Measure	**Vehicles**		**Per Unit Distance**		**Pedestrians**		**Persons**	
Network Level of Service (LOS)	LOS E							
Travel Time Index	3.73							
Speed Efficiency	0.44							
Congestion Coefficient	2.29							
Travel Speed (Average)	17.4	km/h			2.3	km/h	17.4	km/h
Travel Distance (Total)	12468.7	veh-km/h			10.3	ped-km/h	14972.7	pers-km
Travel Time (Total)	714.8	veh-h/h			4.5	ped-h/h	862.3	pers-h/h
Desired Speed	40.0	km/h						
Demand Flows (Total for all Sites)	22281	veh/h			342	ped/h	27079	pers/h
Arrival Flows (Total for all Sites)	21731	veh/h			342	ped/h	26419	pers/h
Demand Flows (Entry Total)	7572	veh/h						
Midblock Inflows (Total)	127	veh/h						
Midblock Outflows (Total)	-517	veh/h						
Percent Heavy Vehicles (Demand)	0.0	%						
Percent Heavy Vehicles (Arrival)	0.0	%						
Degree of Saturation	2.635							
Control Delay (Total)	496.82	veh-h/h			2.33	ped-h/h	598.51	pers-h/h
Control Delay (Average)	82.3	sec			24.5	sec	81.6	sec
Control Delay (Worst Lane)	3006.0	sec						
Control Delay (Worst Movement)	3006.0	sec			49.3	sec	3006.0	sec
Geometric Delay (Average)	0.7	sec						
Stop-Line Delay (Average)	81.6	sec						
Queue Storage Ratio (Worst Lane)	1.00							
Total Effective Stops	16210	veh/h			199	ped/h	19650	pers/h
Effective Stop Rate	0.75		1.30	per km	0.58		0.74	
Proportion Queued	0.70				0.58		0.72	
Performance Index	1348.2				5.6		1353.8	
Cost (Total)	24618.43	$/h	1.97	$/km	114.50	$/h	24732.93	$/h
Fuel Consumption (Total)	1736.3	L/h	139.3	mL/km				
Fuel Economy	13.9	L/100km						
Carbon Dioxide (Total)	4080.3	kg/h	327.2	g/km				
Hydrocarbons (Total)	0.408	kg/h	0.033	g/km				
Carbon Monoxide (Total)	3.931	kg/h	0.315	g/km				
NOx (Total)	1.091	kg/h	0.088	g/km				

Network Model Variability Index (Iterations 3 to N): 8.4 %
Number of Iterations: 20 (Maximum: 50)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.8% 0.5% 0.3%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: New South Wales.

Network Performance - Annual Values						
Performance Measure	**Vehicles**		**Pedestrians**		**Persons**	
Demand Flows (Total for all Sites)	10,694,830	veh/y	164,004	ped/y	12,997,790	pers/y
Delay	238,472	veh-h/y	1,117	ped-h/y	287,284	pers-h/y
Effective Stops	7,780,613	veh/y	95,494	ped/y	9,432,230	pers/y
Travel Distance	5,984,984	veh-km/y	4,935	ped-km/y	7,186,917	pers-km/y
Travel Time	343,104	veh-h/y	2,172	ped-h/y	413,896	pers-h/y
Cost	11,816,850	$/y	54,960	$/y	11,871,810	$/y
Fuel Consumption	833,422	L/y				
Carbon Dioxide	1,958,541	kg/y				
Hydrocarbons	196	kg/y				
Carbon Monoxide	1,887	kg/y				
NOx	524	kg/y				

21 June 10:00am

21 June 11:00am

21 June 12:00pm

21 June 1:00pm

21 June 2:00pm

culmination of overshadowing
(existing & proposed development)

additional FSR (1:1)

URBAN DESIGN
City Strategy Unit

126 Church Street, Parramatta NSW 2150
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www.cityofparramatta.nsw.gov.au

EPPING - ADDITIONAL RESIDENTIAL FSR 1:1 TO COMPENSATE FOR 2 LEVELS OF COMMERCIAL

DRAWING TITLE: Shadow diagram includes existing development plus proposed development with additional FSR 1:1 where applicable

DRAWING NUMBER: 001

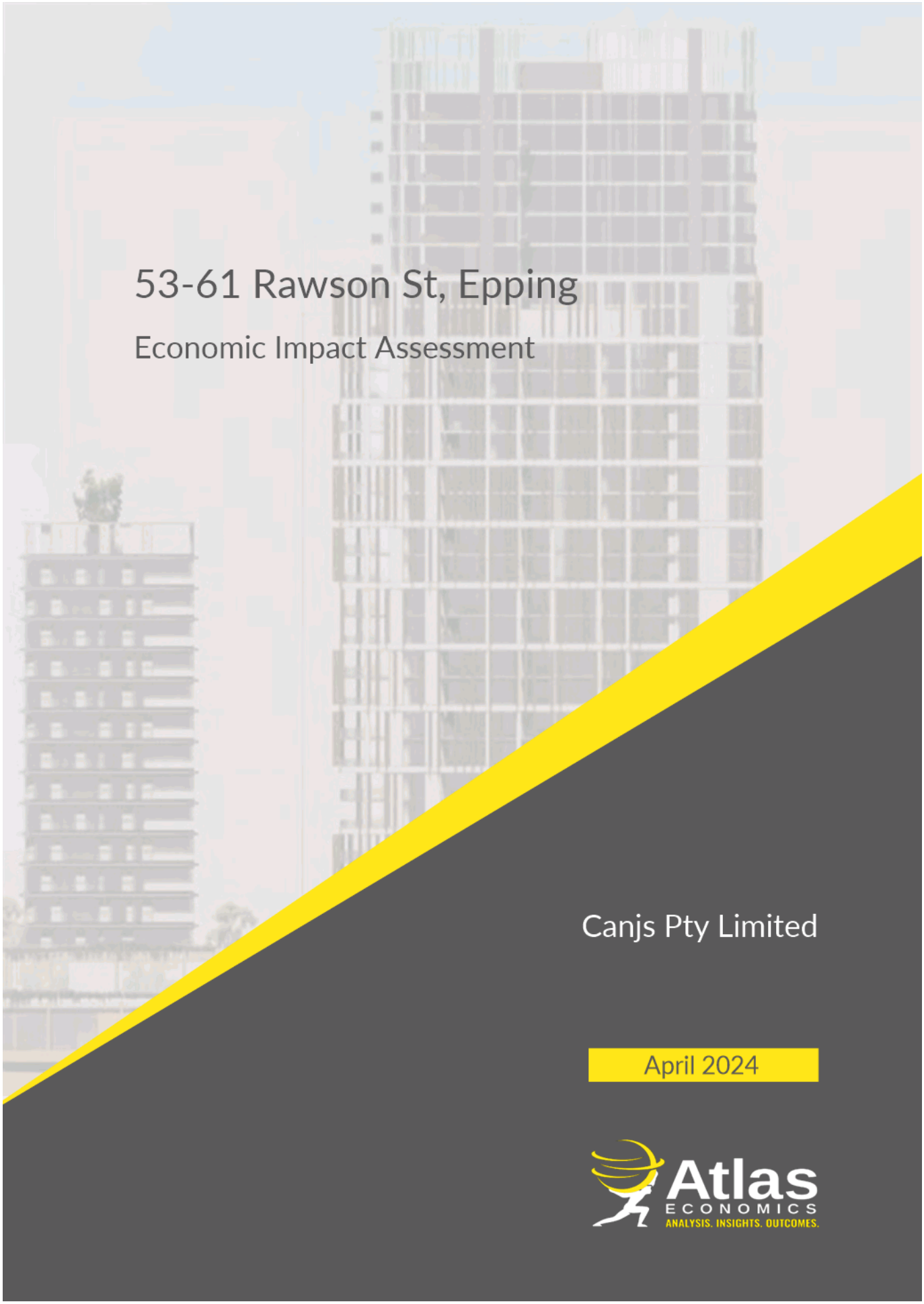
REFERENCE NUMBER:

REVISION	DATE	DRAWN	CHECKED	DESCRIPTION
A	16/11/2020	PB		Shadow diagrams
B	24/11/2020	PB		Revised heights influencing shadow diagrams
C	25/11/2020	PB		Revised heights influencing shadow diagrams
D	9/03/2021	PB		Addition of Bridge Street 1:1 sites influencing shadow diagrams

DRAFT

SCALE
1:10,000 @ A3

Important notice:
Do not scale drawings. All dimensions shall be checked with relevant planner. All discrepancies shall be brought to the attention of the relevant planner. Larger scale drawings and written dimensions take precedence. This drawing is copyright and the property of the author, and must not be retained, copied or used without the express authority of CITY OF PARRAMATTA COUNCIL.



53-61 Rawson St, Epping

Economic Impact Assessment

Canjs Pty Limited

April 2024

Atlas ECONOMICS
ANALYSIS. INSIGHTS. OUTCOMES.

Document Control

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53-61 Rawson St, Epping

Executive Summary

BACKGROUND

53-61 Rawson Street, Epping (the Site) is located in the Epping Town Centre and falls within the City of Parramatta local government area (LGA). The Site is currently zoned E1 Local Centre and subject to a Floor Space Ratio (FSR) of 4.5:1.

Located approximately 200m west of Epping Station (providing both heavy rail and Metro services), the Site is improved with two low rise commercial buildings; a single level supermarket (accommodating a full-line Coles supermarket and various retail tenancies) and low-rise office building (accommodating a mix of commercial, medical and education operators).

The Epping Town Centre (the Town Centre) was rezoned in 2014 by the NSW Department of Planning and Environment. In 2016, the area formerly within the Hornsby Council area was included within City of Parramatta Council (Council) area.

Over the course of 2017-2021, Council commenced a series of technical studies to review the Town Centre, particularly the impact of a decline in commercial floorspace across the centre. This culminated in a planning proposal to facilitate an increase commercial floorspace in the Town Centre. The planning proposal proposed to mandate a minimum floor space ratio (FSR) of 1:1 of non-residential uses on the ground, first and second floors for key sites across the Town Centre. It proposed to increase the maximum FSR by the 1:1 non-residential requirement.

Council's planning proposal did not secure support from the Department of Planning and Environment and did not proceed.

Canjs Pty Limited (Canjs) are progressing a planning proposal to redevelop the Site. Canjs lodged a Planning Proposal to enable the mixed use development of the Site in September 2023, which included a non-residential component of FSR 1:1.

This planning proposal has since been revised to include FSR 1.5:1 of non-residential uses to increase employment opportunities in the Epping Town Centre and to better align with the future role of Epping as identified in the draft Parramatta Economic Development Strategy. The current proposal (referred to as 'the Proposal'), envisages:

- 7,430sqm commercial floorspace.
- 6,247sqm retail floorspace (3,100sqm supermarket, 3,147sqm retail specialties).
- Up to 420 apartments;

Overall, the Proposal is equivalent to an FSR 6.0:1, exceeding the FSR 4.5:1 under the Parramatta Local Environmental Plan.

Atlas Economics (Atlas) have been engaged to carry out an Economic Impact Assessment (EIA) to assess the need for the land uses proposed and examine the economic impacts of the Proposal.

SOCIO-ECONOMIC PROFILE

For the purposes of socio-economic analysis using Australian Bureau of Statistics (ABS) data, the Epping Town Centre has been defined based on a selection of ABS geographies. The area defined for analysis broadly aligns with the Town Centre's E1 Local Centre land use zones and surrounding R4 High Density Residential zones.

A series of observations of relevance to the Proposal can be drawn from the review of the demographic and employment profile of the Town Centre and how this profile is anticipated to evolve over the coming decades.

Residents and Households

- The Town Centre's resident population has grown significantly over the last decade, growing at an average rate of 9% per annum. This reflects the level of high-density residential development which has occurred over this period.
- As at 2021, the Town Centre accommodated a high proportion of young professionals and smaller households (couple-only and lone person) and a lower proportion of couples with children compared to the broader locality of Epping.
- A large proportion of residents in the Town Centre travelled to the Sydney CBD or Macquarie Park/Marsfield for work.

Employment Profile

- Employment in the Town Centre has progressively declined in the last decade. In 2011, it accommodated some 3,000 workers and 1,000 workers in 2021. This fall in local employment is attributed to development activity within the Town Centre; with many former commercial office buildings being redeveloped for high-density residential uses.
- Business and employment activity in the education and training sectors is observed to have increased over 2011-2021.
- The occupational skill levels in the Town Centre are generally high (50% having a tertiary qualification or equivalent).

The socio-demographic and employment analysis shows the transition of the Town Centre can be summarised as two-fold:

- Establishment of a young, well-educated and skilled resident community, many being employed in the Sydney CBD, Macquarie Park and other centres. These residents are conceivably attracted to the accessibility of the Town Centre.
- Transition of the Town Centre from a traditional corporate, office-based centre to a centre for local business services. This has direct implications for the type of commercial floorspace required.

NEED FOR RETAIL AND COMMERCIAL FLOORSPACE

The Town Centre has undergone transformational growth over the last decade. Its resident base has grown from 3,700 residents in 2011 to almost 9,000 residents in 2021, averaging 9% growth per annum. This marked level of rate has been met with a corresponding decline in local workers, which is commensurate with the displacement of commercial floorspace by new development. In 2021, there were ~1,100 local workers compared to 3,000 workers in 2011.

It is evident that whilst the role of the Epping Town Centre has changed, there is a clear need for retail and commercial uses.

Structural Shift in Demand for Commercial and Retail Uses

The COVID-19 pandemic has resulted in a structural shift in demand for some land uses at the macro level.

- Reduction in aggregate demand for retail and commercial office floorspace.
- Increase aggregate demand for industrial floorspace.

As flexible working arrangements have become more engrained, aggregate demand for office space has reduced overall and office floorspace must now provide a 'better offer' to meet market expectations and earn worker commutes.

This has resulted in a preference for high-quality office space and has rationalised demand to contemporary office buildings in high amenity locations. It has also increased the threshold for the viability of commercial development, making it even more challenging for standalone commercial development in minor centres such as the Epping Town Centre. Older office buildings face challenges in meeting the heightened expectations of modern tenants.

From a retail perspective, the trend of 'hyper localism' has been at play even before the COVID-19 pandemic. This refers to the aspirational lifestyle of living, working and playing in close proximity, supporting demand for localised retail facilities which do not require shoppers to travel long distances.

Retail Floorspace in Epping Town Centre

The Site is currently the primary retail anchor for the Town Centre, accommodating a full-line Coles supermarket and some minor specialty shops. The Town Centre lacks a broad retail offering with many existing retailers in older style accommodation. Residents within Epping generally travel to Macquarie Park, Carlingford, Eastwood or Beecroft to have their convenience retail needs met.

A retail demand assessment (Location IQ, 2022) found that the amount of supermarket floorspace provided in the area surrounding the Site (i.e., its Main Trade Area) was less than *half* the Sydney benchmark (99sqm compared to 266sqm per 1,000 persons). This clearly indicated an undersupply of retail floorspace within the Main Trade Area.

The assessment identified demand for up to ~9,000sqm of retail floorspace, which could include a mix of supermarkets, mini-major retailers, retail specialties and non-retail uses. The proposed development (including ~6,500sqm of retail and commercial floorspace) would only *partially* address projected demand for retail floorspace within Epping. Accordingly, the Proposal would not absorb all future demand, with additional development still needed moving forward.

Commercial Floorspace in Epping Town Centre

The Epping Town Centre was historically a medium-sized suburban commercial office market.. It comprised ~55,000sqm of office floorspace (SGS, 2017) across multiple standalone medium-rise office buildings and two business parks - Epping Business Park and Cambridge Office Park. Multiple corporate occupiers were accommodated in these premises, including Unilever, Westpac, NEC Australia and Craig and Rhodes Surveyors, amongst a mix of small and medium sized enterprises.

From as early as 2012/13, many of Epping's largest commercial occupiers began relocating to surrounding office markets such as Macquarie Park and Parramatta. Following the Town Centre's rezoning in 2014, many commercial sites were acquired for high-density development, including the Epping Business Park and Cambridge Office Park.

As more corporate occupiers relocated away from Epping and as the local resident population has grown, the Town Centre's commercial role has evolved. Today, the Town Centre's commercial role is primarily based on provision of local services (particularly around health and education). This is evident from the change in employment profile observed over 2011-2021.

The tenancy profile of businesses currently accommodated on the Site (e.g. education and tutoring centres, medical practices, local real estate agencies) is indicative of the type of demand for commercial floorspace in the Town Centre.

Future Employment Growth

Looking forward, population projections prepared by the NSW Department of Planning and Environment (DPE, 2022) suggest that the Town Centre's resident population is expected to grow significantly in the immediate term to 2026. This has obvious implications for retail and local business services.

Official employment projections used in strategic land use and transport planning across NSW are prepared by Transport for NSW and are commonly referred to as 'Travel Zone' projections.

Based on these projections, the Town Centre is poised to record moderate employment growth over the coming decades - an additional **150 jobs** in the coming decade to 2031, and a further **190 jobs** over 2031-2041. The expectations of employment growth are relatively modest and likely reflective of expectations that the Town Centre is transitioning from historically a minor office market to a commercial services centre focused on the new resident community.

That said, when accounting for the additional floorspace these future jobs could require, **~13,260sqm** of additional floorspace may be needed over 2021-2041. The Proposal could assist in accommodating some of this floorspace.

ROLE FOR THE SITE

The COVID-19 pandemic has resulted in a structural shift to the demand for commercial office floorspace. Aggregate demand for office space has reduced overall and offices must now provide a better offer to meet market expectations. This has resulted in a preference for quality space and has rationalised demand to offices in high amenity locations. The structural change to working arrangements has further reinforced the rise in hyper localism and demand for localised retail facilities.

The Town Centre is a centre in transition. The Study shows that large scale development activity has resulted in:

- A much larger resident population, many of whom are well educated and who reside in younger households.
- A fall in employment as numerous former commercial buildings have been redeveloped over the past decade.
- Growth in the local education and training industries.

A retail demand assessment (Location IQ, 2022) has identified a need for 9,000sqm of retail and non-retail space in the Town Centre. Delivery of retail facilities of this scale requires co-location for those retail uses to be viable. For example, a supermarket would require the ability to cluster with various retail specialities to be viable.

Development across the Town Centre to date has not generated a significant amount of new commercial or retail floorspace. Many developments currently being progressed are on small sites, with limited capacity for large scale provision of retail/ commercial floorspace as identified in the retail demand assessment.

The Site therefore has an important role to play in meeting some of the projected demand for retail and commercial uses in the Town Centre. A contemporary retail and commercial offering as envisaged in the Proposal will significantly improve the retail amenity of the Town Centre, resulting in less 'escaped expenditure' (i.e. the proportion of retail expenditure being captured within the Town Centre).

ASSESSMENT OF ECONOMIC IMPACTS

To estimate the economic impacts that could result from the Proposal, a Proposal Case and Base Case are defined:

- **Base Case**

  The Site continues to operate as a shopping centre with a full-line Coles supermarket (3,300sqm of retail floorspace) and commercial building (4,756sqm of commercial floorspace).

- **Proposal Case**

  The Site is developed as per the Proposal, comprising a mix of land uses across two 33 and 36 storey towers including:

  - 7,430sqm commercial floorspace.
  - 6,247sqm retail floorspace (3,100sqm supermarket, 3,147sqm retail specialties).

The assessment distinguishes the economic impacts during construction and those that are more permanent.

Construction Phase

During construction the Proposal is projected to generate significant economic impacts for the City of Parramatta, including:

- **$407.1 million** in output (including $237.8 million in direct activity).
- **$147.4 million** contribution to GRP (including $60.6 million in direct activity).
- **$83.0 million** in incomes and salaries paid to households (including $40.3 million in direct income).
- **855 FTE jobs** (including 449 FTE directly employed in construction activity).

Operational Phase

In the Base Case, the Site is expected to impact ongoing economic operational activity through direct turnover generated by the retail and commercial activities on-site.

In the Proposal Case, the Proposal would create additional ongoing economic operational activity through direct and indirect (flow-on) impacts associated with operations (and dispersed employment) on the Site.

Compared with the Base Case, the Proposal Case facilitates a notably intensified use of the Site, accommodating more businesses and employment activity, resulting in greater levels of output and contribution to the local economy.

The Proposal is estimated to result in **a net increase in economic activity** through direct and indirect (flow-on) annually at:

- **$164.2 million** additional in output (including $88.5 million in direct activity).
- **$88.6 million** additional in contribution to GRP (including $46.8 million in direct activity).
- **$51.1 million** additional incomes and salaries paid to households (including $31.7 million directly).
- **493 additional FTE jobs** (including 311 additional FTE jobs directly related to activity on the Site).

The Proposal is also expected to generate additional household expenditure supported through new dwellings within the Parramatta LGA. This activity is estimated to support on an ongoing annual basis (once fully developed and occupied):

- **$59.7 million** in total output ($35.2 million directly).
- **$34.7 million** contribution to GRP ($21.2 million directly).
- **$14.6 million** in wages and salaries to local workers ($8.4 million directly).
- **187 FTE jobs** (128 direct FTE).

Compared to the Base Case, the Proposal Case facilitates more local businesses and employment activity, resulting in greater levels of economic contribution and employment opportunities for the Parramatta LGA economy.

CONCLUSION

Economic impact modelling demonstrates the Proposal will deliver significant positive economic benefits, having the ability to contribute significantly to the Parramatta economy over the long-term.

Economic modelling indicates the Proposal will make a significant contribution to the Parramatta economy. The Proposal is expected to generate an annual GRP of $148.4 million to the local economy and support 485 FTE jobs on-site.

The Proposal will contribute to meeting demand for retail and local commercial services including the growing health and education-related sectors seeking to meet the growing needs of the local population. The Proposal will facilitate reduced 'escaped expenditure' and travel to other centres.

Importantly, the Proposal will contribute to a much-need increase in contemporary commercial floorspace within the Epping Town Centre. As such, it aligns with the expected role of Epping as a major employment and business hub that capitalises on improved transport links as identified in the *Draft Parramatta Economic Development Strategy* (City of Parramatta, 2023).

Overall, the Proposal is considered to have clear economic and market merit and will assist the Epping Town Centre continue in its transition to a service-based centre. It is recommended that the City of Parramatta support the Proposal, subject to other technical findings.

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1. Introduction

1.1 Background

Epping was identified as a Priority Precinct in 2012 by the NSW Department of Planning and Environment (DPE). This led to the rezoning of the Epping Town Centre (the Town Centre) in 2014 to facilitate new high-density housing.

Multiple existing commercial buildings were redeveloped for high-density residential development over several years, displacing existing commercial occupiers and resulting in a loss of commercial floorspace across the Town Centre.

Following the realigning of the Hornsby and Parramatta local government areas (LGAs) in 2016, Epping became part of the Parramatta LGA. Over the course of 2017-2021, Council commenced a series of technical studies to review the Town Centre, particularly the impact of a decline in commercial floorspace across the centre.

Epping Town Centre Commercial Floorspace Planning Proposal

In 2017, SGS was engaged by Council to prepare a Commercial Floorspace Study (the SGS Study) for the Town Centre. The SGS Study sought to examine the quantum of commercial (retail, office and business) floorspace required in Epping to meet existing and future demand.

The SGS Study noted that Epping was identified as a Priority Precinct in 2012 and subsequently in 2016 as a local centre under the draft Central West District Plan. Priority Precinct planning envisioned a compact high density town core centre and prioritised dwelling growth. This led to large scale displacement of commercial floorspace in favour of residential uses.

The SGS Study found that growth in retail/commercial floorspace in Epping was limited to ground floor uses within new mixed-use developments. This meant there was latent capacity for retail/commercial floorspace that was not being realised, given planning controls permitted non-residential uses within 2-3 levels of new mixed-use developments.

The SGS Study observed that demand for retail and commercial floorspace in Epping remained strong. Many businesses were unable to secure appropriate premises (at suitable lease terms without demolition clauses) as landowners managed the tension between the retention of existing uses and the potential for high-density redevelopment. Additionally, existing commercial floorplates were small and no longer met the needs of larger businesses. Consequently, larger tenants relocated to neighbouring commercial office precents such as Macquarie Park.

Given Epping's proximity to other strategic centres, access to public transport infrastructure and projected population growth, the SGS Study identified a potential role for Epping as a sub-district centre.

It envisioned Epping as playing a role to meet the needs of a growing resident population (providing for local employment opportunities) and providing higher-order services and commercial space for diverse business sizes. The SGS Study recommended a minimum non-residential FSR be applied to new mixed-use developments in Epping.

In response to the findings of the SGS Study and a series of technical studies, Council lodged a planning proposal in 2021 to facilitate an increase in commercial floorspace across the Town Centre. The planning proposal proposed to mandate a minimum floor space ratio (FSR) of 1:1 of non-residential uses on the ground, first and second floors for key sites across the Town Centre. It proposed to increase the maximum FSR by the 1:1 non-residential requirement.

Ultimately Council's planning proposal did not secure support from DPE and did not proceed.

Since that time, the City of Parramatta (2023) have released a draft Economic Development Strategy which identifies Epping's role moving forward as "a major employment and business hub, it will capitalise on improved transport links to Parramatta CBD, and proximity to the Macquarie Park Innovation District".

The Proposal

Canjs Pty Limited (Canjs) are progressing a planning proposal to redevelop 53-61 Rawson Street, Epping (the Site). Canjs lodged a Planning Proposal to enable the mixed use development of the Site in September 2023, which included a non-residential component of FSR 1:1.

This planning proposal has since been revised to include FSR 1.5:1 of non-residential uses to increase employment opportunities in the Epping Town Centre and to better align with the future role of Epping as identified in the draft

Parramatta Economic Development Strategy. The current proposal (referred to as 'the Proposal'), envisages a mix of land uses across two 33 and 36 storey towers including:

- 7,430sqm commercial floorspace.
- 6,247sqm retail floorspace (3,100sqm supermarket, 3,147sqm retail specialties).
- Up to 420 apartments;

Overall, the Proposal envisages some 54,500sqm of floorspace. This is equivalent to an FSR 6.0:1, exceeding the FSR of 4.5:1 under the Parramatta Local Environmental Plan.

1.2 The Site

The Site is located at 53-61 Rawson Street with dual frontage to Carlingford Road and Rawson Street within the Epping Town Centre. Spanning a total of 9,089sqm in site area, the Site is improved with two low rise commercial buildings; a single level supermarket (accommodating a full-line Coles supermarket and various retail tenancies) and low-rise office building (accommodating a mix of commercial, medical and education operators).

The Site is zoned E1 Local Centre under the Parramatta Local Environmental Plan (PLEP 2023) with a permitted floor space ratio (FSR) of 4.5:1 and maximum building height of 48m.

The Site is positioned some 200m west of the Epping Train Station, providing access to both the T9 Northern line and Metro Northwest services. Several bus routes also run through the Town Centre. These public transport services connect the Town Centre to several other centres across Greater Sydney including Parramatta, Macquarie Park, Chatswood, Hornsby, North Sydney and the Sydney CBD.

Surrounding land uses include a mix of retail and commercial services, mostly clustered along Beecroft Road, Oxford Street and Rawson Street. This includes a mix of fine grain commercial buildings and standalone commercial buildings, accommodating a mix of local businesses including restaurants, tutoring centres and medical practices. Modern, high density apartment buildings are also observed throughout the Town Centre, notably along Carlingford Road and Cambridge Street.

Figure 1.1 illustrates the locational context of the Site.

Figure 1.1: The Site

Source: Atlas

1.3 Scope and Approach

Atlas Economics (Atlas) is engaged by Canjs to undertake an Economic Impact Assessment (EIA) to assess the need for the Proposal and examine the economic impacts should the Proposal be delivered.

To fulfill the requirements of the brief, the Study examines:

- Historical population and employment growth in the Town Centre and broader Catchment Area.
- The socio-demographic and employment profile of the Town Centre and broader Catchment Area.
- The structural trends that influence demand for retail and commercial floorspace.
- Demand for retail and commercial uses in the Town Centre and the role the Site could play in meeting that demand.
- The economic impact of the Proposal compared to a base case without the Proposal.

1.4 Assumptions and Limitations

Atlas acknowledges several assumptions and limitations associated with this Study.

- At the time of writing, the fallout from the COVID-19 pandemic across the NSW economy is still playing out. The medium to long-term implications for population and employment growth are yet to be fully understood.
- The macro-economic outlook is currently subject to significant uncertainty, with COVID-19, labour shortages, inflation, and multiple global conflicts.
- The 2021 Census was administered during the COVID-19 pandemic and at a time of widespread lockdowns across Australia's east coast. Activity recorded at this time may not be accurately representative of employment levels.
- Growth projections relied upon do not necessarily reflect contemporary trends.
    - Population and dwelling projections (by DPE) were released in early 2022 (post-COVID-19) but prior to release of Census 2021 data.
    - Employment projections by Transport for NSW'S Transport, Planning and Analytics (TPA) division were released in 2019, prior to COVID-19 and before the Census 2021.
- Market research is carried out on a 'desktop' basis without the benefit of site surveys and internal inspections.
- Floorspace supply data is sourced from various third-party databases and subscriptions and is not validated.

Notwithstanding the above, all due care, skill and diligence has been applied to this Study as is reasonably expected.

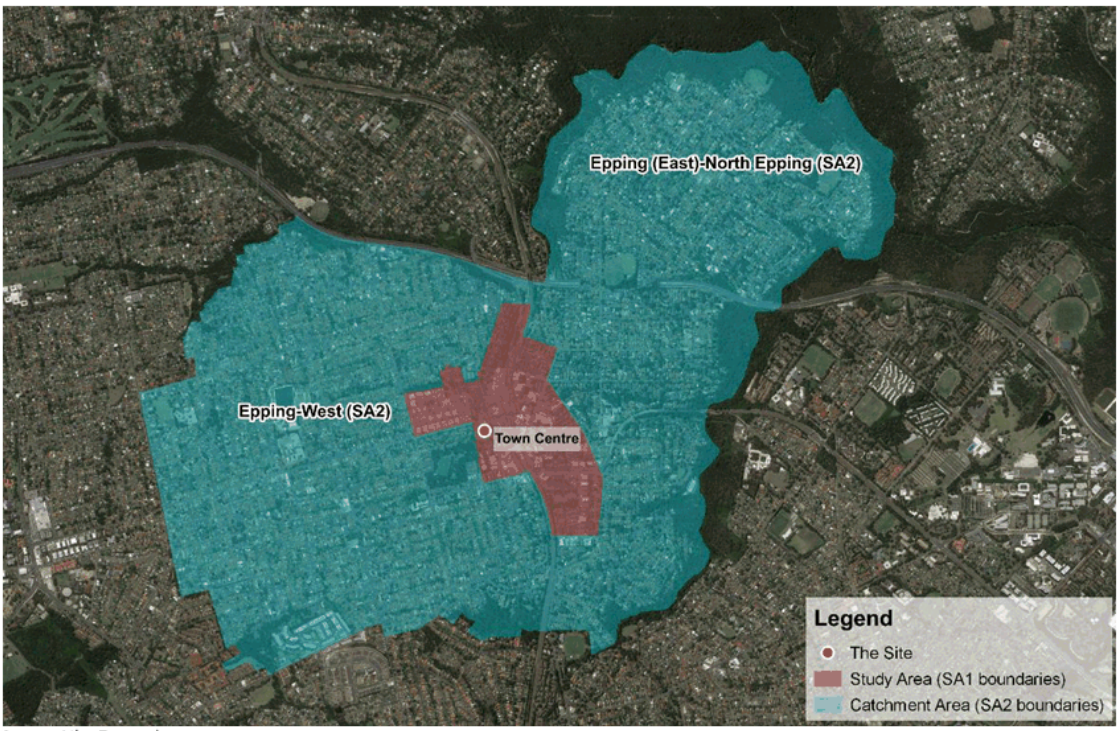
2. Socio-Economic Context

The basis of demographic analysis is the Australian Bureau of Statistics (ABS) Census. The ABS defines a series of geographies known as Statistical Areas (SA) which vary in size and range from SA4s (large regions comprising multiple local government areas) to SA1s (often smaller than a suburb). Census data can be extracted based on these statistical areas to understand the socio-demographic profile of different areas at various geographies.

For the purpose of analysing the socio-demographic profile of the Epping Town Centre, a number of SA1 geographies have been selected and are referred to as the 'Study Area'. A series of SA2 geographies has also been selected to analyse the socio-demographic characteristics of the broader locality. These SA2 geographies, namely 'Epping (East)-North Epping' and 'Epping-West' are collectively referred to as the 'Catchment Area'.

Figure 2.1 defines the boundaries of the Study Area and Catchment Area.

Figure 2.1: Epping Town Centre, Study Area and Catchment Area Boundaries



Source: Atlas Economics

2.1 Socio-demographic Profile

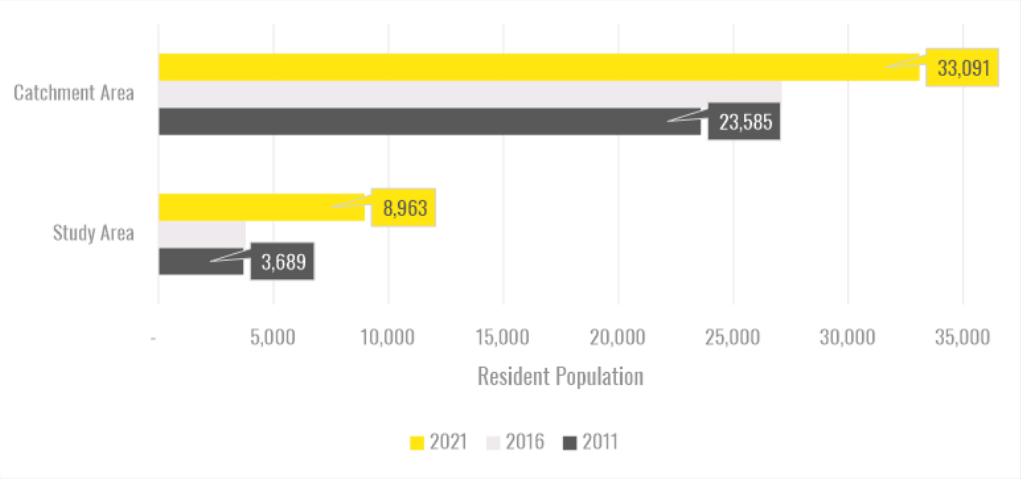
2.1.1 Historical Population Growth

In 2011, the Study Area recorded a population of some 3,690 residents. By 2021, this grew to some 8,960 residents, reflecting an average annual growth rate of 9% over the 2011-2021 period. This annual rate of population growth was notably higher than the 3% annual growth observed in the broader Catchment Area over the same period.

Of the 5,270 additional residents recorded in the Study Area over 2011-2021, 98% (5,160 residents) were recorded over 2016-2021. This aligns with the completion of several residential developments in the Town Centre over that period.

Figure 2.2 illustrates the change in population in both the Study Area and Catchment Area over the 2011-2021 period.

Figure 2.2: Population Growth (2011-2021), Study Area and Catchment Area

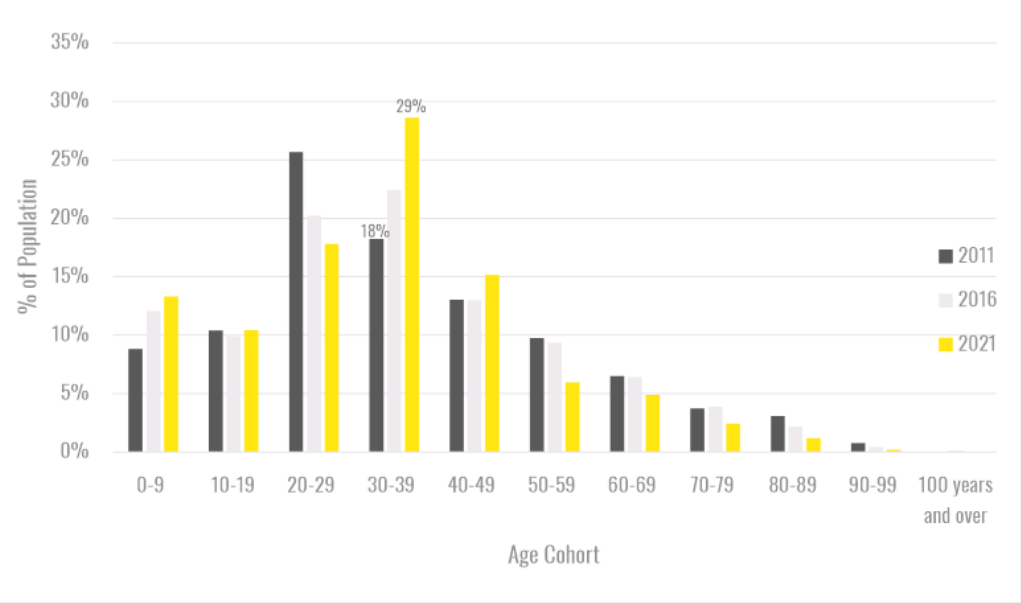


2.1.2 Age Profile

The age profile of the Study Area is indicative of a relatively young population - 29% of residents are aged between 30-39 years as at 2021. This contrasts with the broader Catchment Area, where 30–39-year-old residents accounted for a lower proportion of 17% of the population. Collectively, 68% of Study Area residents were of working age - aged 20-59 years in 2021 (~6,050 residents). Working age residents were also well represented in the Catchment Area at 56%.

Over the 2011-2021 period, the Study Area recorded a strong growth in residents aged 30-39 years, reflecting the large cohort of new residents who were accommodated in newly completed apartments across the Town Centre.

Figure 2.3: Age Profile (2011-2021), Study Area



Source: ABS (2021)

The Study Area is evidently home to a large and growing population of working age, with need for commensurate community infrastructure, retail and business services.

2.1.3 Household Composition

In 2011, there were ~1,470 households residing within in the Study Area, with lone person households accounting for the majority (30%) of these households. Other major household types included couple families with children (27%) and couple-only households (23%).

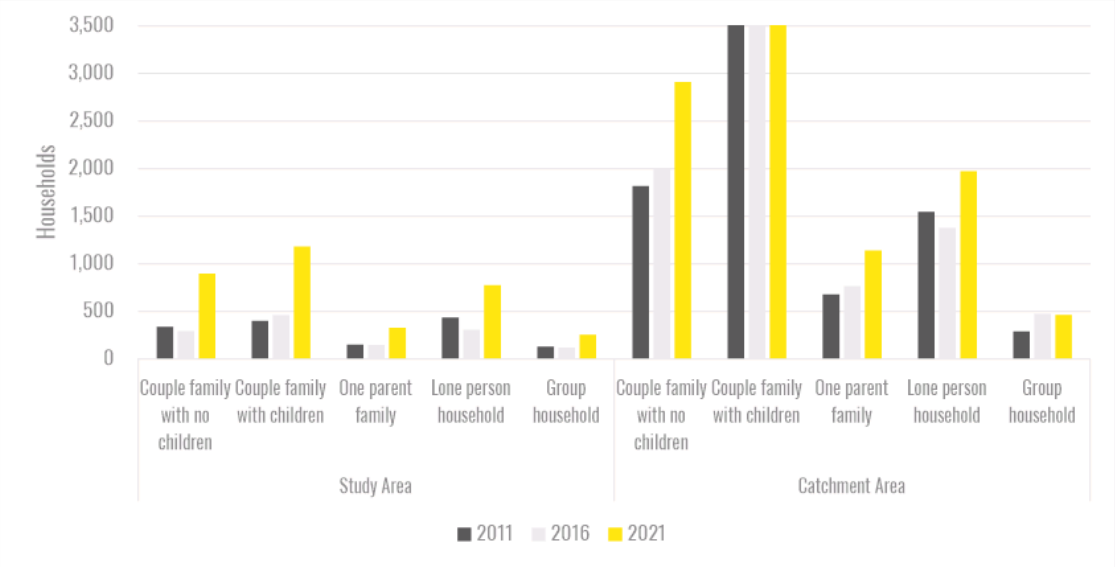
Over the 2011-2021 period, the Study Area recorded strong growth in the number and proportion of couples without children and couple families with children. In 2021, 34% of households were couple families with children, followed by 26% and 23% of couple-only and lone person households respectively.

Whilst the household composition in the Study Area is broadly aligned with the Catchment Area, the Catchment Area accommodates a higher proportion of couple families with children (44%) and lower proportion of couple-only (25%) and lone person households (17%).

This suggests the Study Area is attractive to younger and smaller household types (couple-only and lone person) and is likely attributed to the Town Centre's strong apartment offering in an accessible location close to various employment centres.

Figure 2.4 illustrates the mix of household types in the Study Area over 2011-2021.

Figure 2.4: Household Types (2011-2021), Study Area



Source: ABS (2021)

2.1.4 Occupation Profile

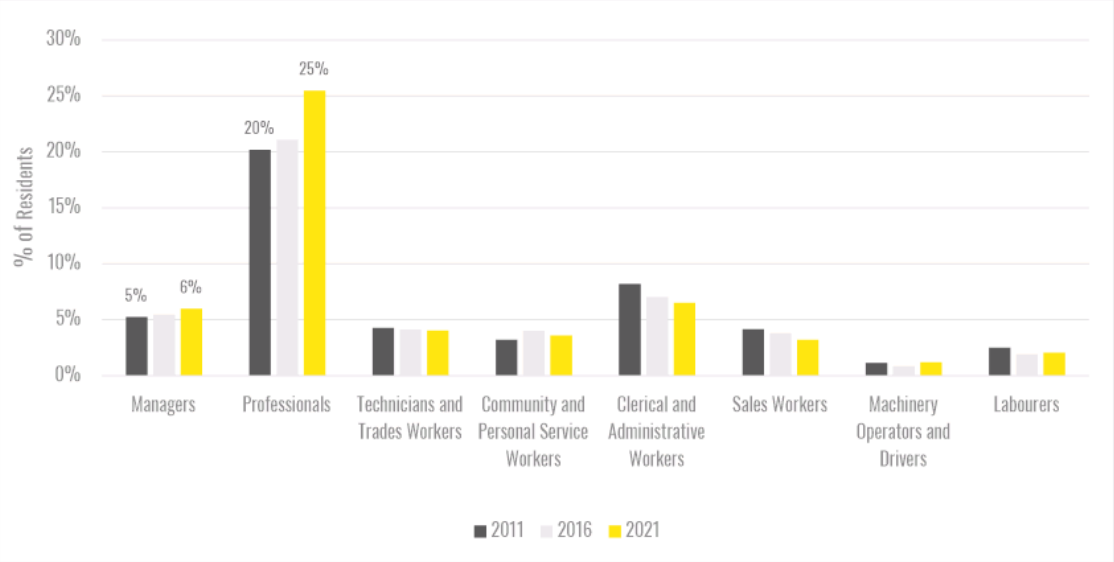
In 2021, 25% of working residents within the Study Area were employed as professionals (2,280 residents), followed by 7% and 6% of clerical and administrative workers (585 residents) and managers (540 residents) respectively.

These occupation types reflect traditional 'white-collar jobs', and collectively represent 38% of the Study Area's resident workforce (3,400 residents). Similarly, the occupation profile of the Catchment Area reflects a large majority of white-collar workers. Compared to the Study Area, however, it recorded a lower proportion of professionals at 22% in 2021.

Over the 2011-2021 period, the Study Area recorded a growing number of professionals (+5%) and managers (+1%), reflective of the new residents the Town Centre attracted over this period.

Figure 2.5 depicts the occupation profile of Study Area residents over the 2011-2021 period.

Figure 2.5: Occupation Profile (2011-2021), Study Area



Source: ABS (2021)

2.1.5 Journey to Work

In 2021, some 9% of Study Area residents were employed within the Catchment Area. A large proportion of Study Area residents travelled to the Sydney CBD and surrounds (18%) as well as Macquarie Park/Marsfield (10%) for work.

In the last decade, the proportion of Study Area residents who worked locally fell nominally from 10% in 2011 to 9% in 2021. Dominant places of employment remained largely unchanged, namely the Sydney CBD and Macquarie Park/Marsfield.

Table 2.1 depicts the dominant places of work where Study Area residents were employed over the 2011-2021 period.

Table 2.1: Top 4 Places of Employment (2021), Study Area (Residents)

Place of Work (SA2)	2011	2016	2021	Change (2011-21)
Catchment Area	**10%**	**9%**	**9%**	**-1%**
Sydney (North) - Millers Point	15%	18%	18%	+3%
Macquarie Park - Marsfield	11%	13%	10%	-1%
North Sydney - Lavender Bay	4%	5%	6%	+2%
Chatswood (East) - Artarmon	3%	4%	4%	+1%

Source: ABS (2021)

Whilst the proportion of residents in the Study Area travelling for work remained largely unchanged in the decade, more residents (in numbers terms) are travelling outside the locality for employment.

The journey-to-work patterns of Study Area residents are representative of the appeal of the Town Centre and its accessibility by public transport to white collar professionals employed in other employment centres.

2.2 Employment Profile

In order to analyse the Town Centre's employment profile, a series of ABS geographies known as Destination Zone (DZ) were selected as the basis of analysis. DZ geographies are the smallest geography at which historical employment Census data is available. These DZ geographies selected for analysis are referred to as the 'Town Centre Area'.

Figure 2.6 illustrates the geographical boundaries of the Town Centre Area and its locational context.

Figure 2.6: Town Centre Area

Source: Atlas Economics

Industry Classifications

The ABS categorises employment activity into 19 industry sectors referred to as ANZSICs (Australian New Zealand Standard Industry Classification). These are the most commonly utilised categorises used when analysing an areas employment profile.

It is also useful to consider employment composition in broader industry terms. Broad industry classifications (**BIC**) group the 19 ANZSIC sectors into four main industry categories - population-serving, knowledge-intensive, health and education and industrial. These BIC groupings and their corresponding ANZSIC are shown in **Table 2.2**.

Table 2.2: Broad Industry Classifications by 19-Digit ANZSIC

Population Serving	Knowledge-Intensive	Health and Education	Industrial
• Construction • Retail Trade • Accommodation & Food Services • Arts & Recreation Services • Other Services	• Information, Media & Telecommunications • Financial & Insurance Services • Rental, Hiring & Real Estate Services • Professional, Scientific & Technical Services • Administrative & Support Services • Public Administration & Safety	• Education & Training • Health Care & Social Assistance	• Agriculture, Forestry & Fishing • Mining • Manufacturing • Electricity, Gas, Water & Waste Services • Wholesale Trade • Transport, Postal & Warehousing

Source: ABS/Atlas Economics

2.2.1 Employment by Industry

In 2011, the Town Centre Area accommodated some ~3,000 workers. Over the 2011-2021 period, employment fell to approximately 2,580 workers in 2016 and 1,110 workers in 2021. This indicates an decline of ~1,900 jobs, or an average 10% decline per annum in the last decade. **Table 2.3** provides a breakdown of employment activity over 2011-2021.

Table 2.3: Employment by Industry, Town Centre Area (2011-2021)

Industry (ANZSIC)	2011		2016		2021		Change (2011-21)	
	No.	%	No.	%	No.	%	No.	%
Agriculture, Forestry and Fishing	3	0%	-	0%	-	0%	-3	0%
Mining	-	0%	-	0%	-	0%	0	0%
Manufacturing	507	17%	39	2%	13	1%	-494	-16%
Electricity, Gas, Water and Waste Services	-	0%	5	0%	-	0%	0	0%
Construction	50	2%	76	3%	75	7%	25	5%
Wholesale Trade	99	3%	40	2%	9	1%	-90	-2%
Retail Trade	192	6%	209	8%	52	5%	-140	-2%
Accommodation and Food Services	231	8%	275	11%	79	7%	-152	0%
Transport, Postal and Warehousing	45	1%	30	1%	45	4%	0	3%
Information Media and Telecommunications	38	1%	26	1%	21	2%	-17	1%
Financial and Insurance Services	455	15%	543	21%	55	5%	-400	-10%
Rental, Hiring and Real Estate Services	127	4%	171	7%	56	5%	-71	1%
Professional, Scientific and Technical Services	267	9%	285	11%	184	17%	-83	8%
Administrative and Support Services	48	2%	37	1%	29	3%	-19	1%
Public Administration and Safety	55	2%	37	1%	8	1%	-47	-1%
Education and Training	194	6%	280	11%	244	22%	50	16%
Health Care and Social Assistance	511	17%	269	10%	117	11%	-394	-6%
Arts and Recreation Services	19	1%	6	0%	8	1%	-11	0%
Other Services	147	5%	153	6%	65	6%	-82	1%
Inadequately Described / Not Stated	21	1%	96	4%	38	3%	17	3%
Total	**3,009**	**100%**	**2,577**	**100%**	**1,098**	**100%**	**1,911**	
Broad Industry Classification (BIC)								
Population-Serving	639	21%	719	28%	279	25%	-360	4%
Knowledge-Intensive	990	33%	1,099	43%	353	32%	-637	-1%
Health and Education	705	23%	549	21%	361	33%	-344	9%
Industrial	651	22%	114	4%	67	6%	-584	-16%
Total	**3,009**	**100%**	**2,577**	**100%**	**1,098**	**100%**	**1,911**	

Source: ABS (2021)

As shown from **Table 2.3**, the industry profile of the Town Centre Area has evolved.

- In 2011, knowledge-intensive and population serving industries were key employers (34% and 29% respectively).
- Over 2011-2021, health and education employment grew significantly from 23% in 2011 to 33% in 2021, overtaking knowledge-intensive industries at 32% as the largest employing sectors.

The shift in employment industry composition in the Town Centre Area denotes a centre in transition. Business and employment activity is observed to be responding to the outcomes of large-scale development activity:

- Displacement of financial and insurance services employment as commercial buildings are redeveloped.
- Decline in retail trade and accommodation and food services (notwithstanding the impact of COVID-19 lockdowns).
- Growing proportion of education and training employment corresponding to a growing resident community.

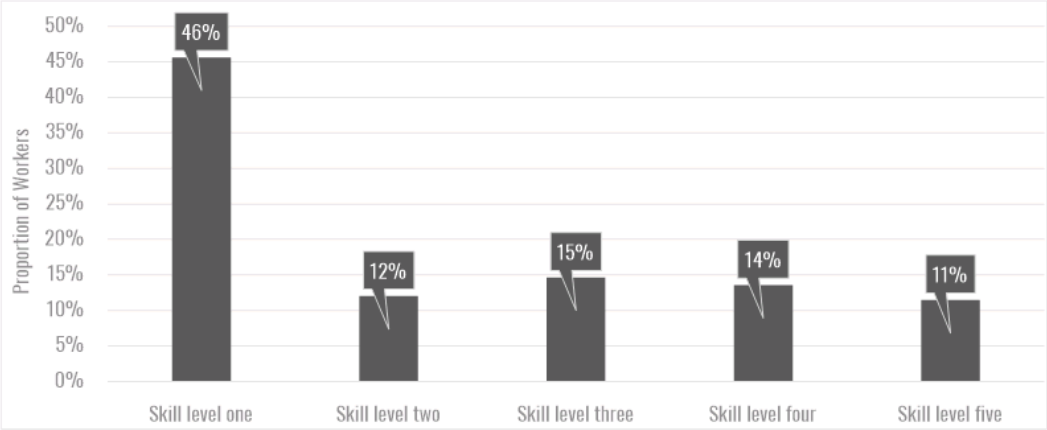
2.2.2 Skill Level

The 2021 Census categorises occupation types by skill levels, ranked in order of decreasing requirements from 1 to 5. That is, occupations requiring the highest skillset are ranked Level 1 and the lowest skills at Level 5.

In 2021, a 46% majority of workers in the Town Centre Area occupied Level 1 jobs. This represents occupations requiring a Bachelor's degree or higher qualification, or at least 5 years of experience in a relevant industry. This proportion is broadly aligned with that of the Catchment Area (47%) and significantly higher than the 19% in Greater Sydney, demonstrating that the Town Centre accommodates a large number of highly skilled workers.

Figure 2.7 provides a breakdown of occupation by skill level in the Town Centre Area in 2021.

Figure 2.7: Employment by Skill Level, Town Centre Area (2021)



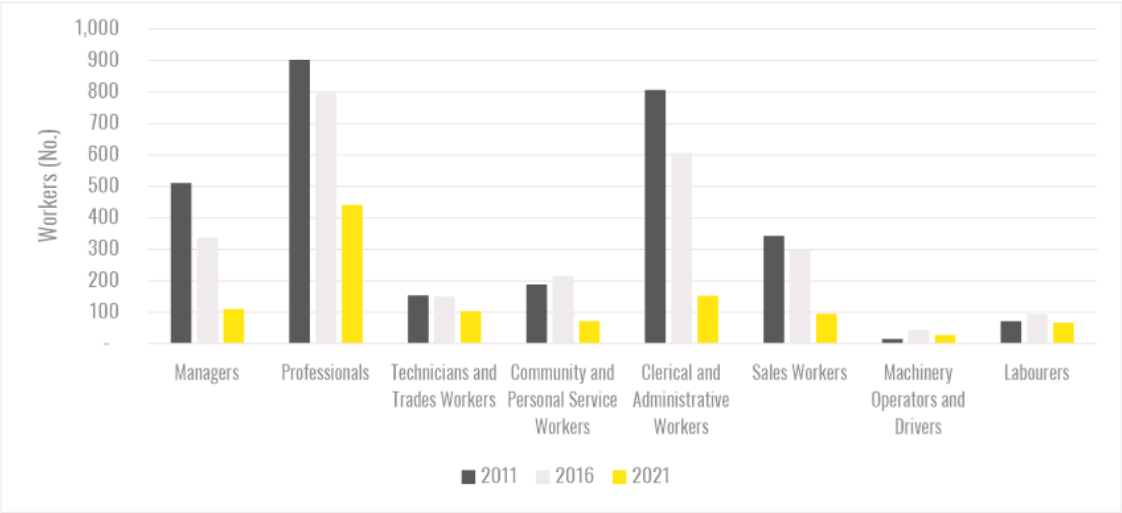
Source: ABS (2021)

2.2.3 Employment by Occupation

In 2021, a 41% majority of workers in the Town Centre Area were professionals. Whilst the occupation profile of the Town Centre Area has remained relatively consistent over the 2011-2021 period, there has been sharp declines in the number of professionals and clerical and administrative workers over this period. This is reflective of the types of occupiers who have relocated from the Study Area during this time.

Figure 2.8 illustrates the occupation profile in the Town Centre Employment over 2011-2021.

Figure 2.8: Occupation Profile, Town Centre Employment (2011-2021)



Source: ABS (2021)

2.3 Key Findings

Based on the socio-demographic analysis of the Study Area and employment profiling of the Town Centre Area, key observations drawn from this Chapter include:

- The Study Area's population has grown by some ~5,200 residents over the past decade at an average rate of 9% per annum. This is notably higher than the 3% average annual growth rate recorded in Catchment Area.
- In 2021, the Study Area accommodated a high proportion of young professionals and smaller households (couple-only and lone person) and a lower proportion of couples with children compared to the broader Catchment Area.
    - 29% of residents were aged 30-39 years with 56% of working age (aged 20-59 years).
    - 34% of households are couple families with children, 26% couple-only and 23% lone person households.
- Most residents are employed in 'white collar' occupations, with 25% of working residents being professionals with 13% being managers and clerical and administrative workers collectively.
- A large proportion of working residents travel to the Sydney CBD or Macquarie Park/Marsfield for work.
- Employment in the Town Centre Area has progressively declined over the past decade. In 2011, the Town Centre Area accommodated some 3,000 workers. By 2021, this has fallen ~1,000 workers, representing a decline of ~1,900 jobs (or a 64% decline). This was primarily a function of several large commercial sites within the Town Centre being redeveloped for residential uses in response to Epping Town Centre's rezoning in 2014, resulting in several major occupiers relocating to other centres.
- Despite the displacement of employment in some industries to other centres, the analysis of employment composition provides important insight into the Town Centre's transition. Business activity (particularly in education and training) is observed to have responded to the growth of the local resident population. This can be directly observable on the Site, with several current tenants being health and education operators.
- The occupational skill levels observed in the Town Centre Area are generally high (almost 50% having Skill Level 1)

The socio-economic analysis clearly shows the transition of the Town Centre and can be summarised as two-fold:

- Establishment of a young, well-educated and skilled resident community, many being employed in the Sydney CBD, Macquarie Park and other centres. These residents are conceivably attracted to the accessibility of the Town Centre.
- Transition of the Town Centre from a traditional corporate, office-based centre to a centre for local business services. This has direct implications for the type of commercial floorspace required.

The next chapter considers the economic and market trends which influence the need for, and nature of commercial floorspace in the Town Centre.

3. Market Appraisal

3.1 Structural Trends and Drivers

Demand for commercial floorspace is driven by structural trends at the macro level by how businesses use and require space. At the micro level, the characteristics of floorspace demand drive demand for space in centres and individual sites.

Hybrid (Flexible) Working

Hybrid working refers to a working arrangement in which office-based workers split their working week between the office, their home and in some cases a third space such as a co-working facility, library or local coffee shop.

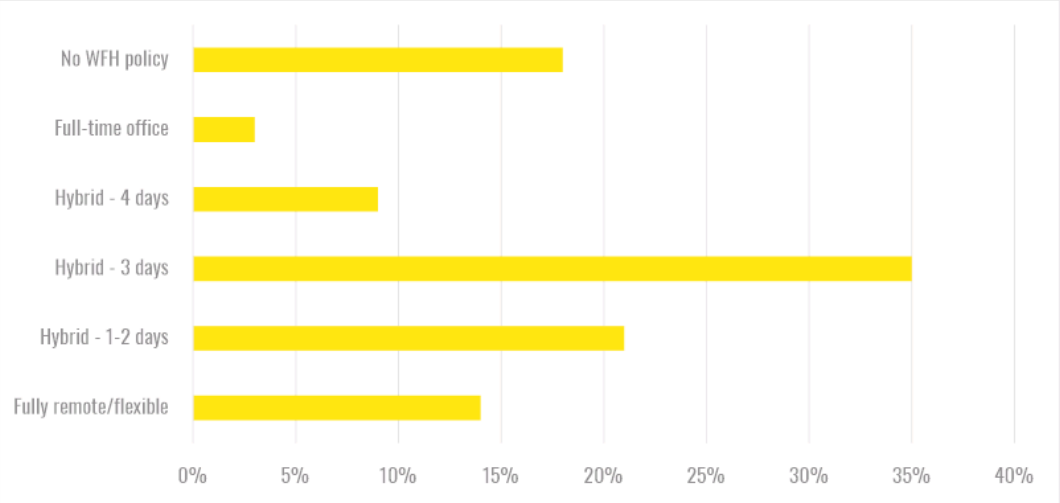
Government mandates during the COVID-19 pandemic (the pandemic) to contain the spread of the virus obligated all workers who could work from home (WFH) to do so. Millions of formerly office-based employees instantly gave up their daily commutes and workplaces. Hybrid working was a trend already underway prior to the pandemic, however the pandemic accelerated the realisation of this structural change from perhaps 5-10 years to 12-24 months.

Rather than leading to a collapse in output which had been feared, WFH led to the following outcomes:

- Organisations realised how some tasks could be performed at home with either neutral or positive productivity impacts.
- Employees valued the travel time and cost savings that WFH provided and its greater flexibility.
- Employers accepted the employee engagement benefits of hybrid working arrangements and the financial benefits achievable through reducing or consolidating their physical office footprint.

Hybrid working is now the default position for Australian corporates with office-based workers (**Figure 3.1**). Two-thirds of corporate occupiers have a hybrid working policy and 14% are fully remote. Only 3% of office workers are in the office 5 days a week. The average Australian worker now spends over a quarter of their working week (27%) outside the office.

Figure 3.1: Australian Corporate Working-from-home (WFH) Policies Breakdown



Source: The Aussie Corporate, March 2023

The entrenchment of hybrid working within office-based businesses has had major ramifications for aggregate demand in the commercial office sector. Overall, hybrid working has a negative impact on per person office demand as occupiers do not need to provide space for all full-time employees to have a permanent desk.

Shift in Market Expectations

In a post-COVID-19 market, occupier demand is focusing on a specific type of office space which provides:

- Flexible spaces that can be adapted to accommodate a wide variety of activities.
- High-quality sustainability credentials.
- Quiet spaces for phone calls or working.
- An abundance of meeting spaces and places for collaboration.
- Good access to public transportation.
- Food and beverage amenities such as an on-site café, health and wellness facilities.

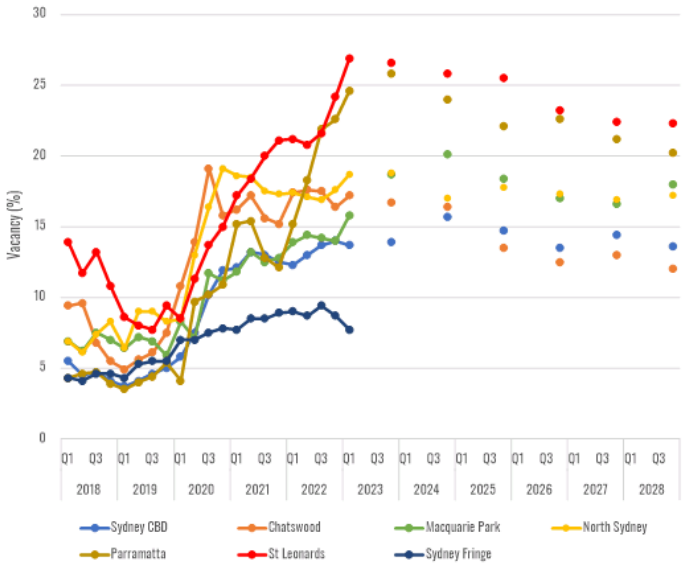
To meet these requirements, demand is focusing on the best quality contemporary space at the expense of older-style buildings (secondary grade stock).

The shift in market expectations towards quality space with high amenity is directly observable in rent and vacancy data. Vacancy rates in all office markets have remained elevated since 2020. All office markets are 'working through' the floorspace that is currently vacant. Landlords are offering generous incentives and tenants have the ability to 'pick and choose' office premises that suit their requirements.

Existing office buildings and office developments that are under construction are in competition to capture investment from a smaller pool of tenants. Secondary rents in particular are under significant pressure amid a flight to quality.

Figure 3.2 shows historical vacancy rates in Sydney's metropolitan office markets to Q1 2023. These vacancy rates are forecast towards the end of the decade in 2028 (allowing for new completions and commitments over that period).

Figure 3.2: Vacancy Rates (Historical and Forecast), Sydney Metropolitan Office Markets



Source: JLL, Q2 2023

The reduction in aggregate demand for commercial office floorspace and the shift in market expectations for the quality of office floorspace is relevant for minor commercial centres like the Epping Town Centre. It is conceivable that had the large scale redevelopment of commercial buildings in the Town Centre not occurred, these buildings would now be under significant pressure from rising vacancy and falling effective rents.

Until vacancy rates return to 'normal' levels (5%-10%), effective rents will remain depressed which negatively impacts on development feasibility and the viability of new office development in all markets. These further challenge the viability of development of standalone or large scale office development in the Town Centre.

Hyper Localism

Worker preferences which have moved away from commuting large distances to work have been mirrored in consumer spending patterns. The aspirational lifestyle of living, working and playing in close proximity supports demand for localised retail facilities which do not require shoppers to travel large distances. The trend of hyper localism has been at play even before the COVID-19 pandemic.

Given that the average Australian office worker now spends 27% of their time working outside of the office, there is now a reinforced demand for retail and commercial services at the local level close to where people live.

Further, given the clear environmental benefits of more localised consumer habits, this aligns will with the growing wellness and sustainability agenda. Hyper local shopping patterns expect and support a localised network of retail centres of all sizes.

Hyper local consumer spending patterns create strong demand for a greater range of retail and leisure goods to be provided close to where people live and work. Retail floorspace will be a critical component of creating a viable, healthy Town Centre which meets the needs of residents and workers and supports planning policy objectives.

3.2 Epping Town Centre

Office Land Uses

The Epping Town Centre was historically a medium-sized suburban commercial office market. It comprised ~55,000sqm of office floorspace (SGS, 2017) across multiple standalone medium-rise office buildings and two business parks - Epping Business Park and Cambridge Office Park. Multiple corporate occupiers were accommodated in these premises, including Unilever, Westpac, NEC Australia and Craig and Rhodes Surveyors, amongst a mix of small and medium sized enterprises.

From as early as 2012/13, many of Epping's largest commercial occupiers began relocating to surrounding office markets such as Macquarie Park and Parramatta. Following the Town Centre's rezoning in 2014, many commercial sites were acquired for high-density development, including the Epping Business Park and Cambridge Office Park.

Today, Epping's office market comprises some 40,000sqm of office floorspace across some 30 buildings (Arealytics, 2023). Office stock is generally characterised by low rise commercial buildings (1-3 storeys), with higher density developments (4-7 storeys) predominantly located in the Town Centre. These are mainly situated along Bridge Street, Rawson Street, Oxford Street and Cambridge Street. Existing buildings are dated and mostly comprise secondary grade stock.

Contemporary commercial space is limited, though examples include 16-18 Bridge Street, 51 Rawson Street (part of the Site) and 3 Carlingford. These buildings accommodate a mix of educational operators, specialist health services and local business services (e.g., real estate agencies).

Office buildings and commercial suites within the Town Centre range from 130sqm to 6,700sqm of internal area (mostly sub-500sqm). Occupiers include a range of business and service providers. Amongst the diverse commercial profile, dominant occupiers include accounting/bookkeeping, educational and medical services. Many of these service-oriented occupiers have grown organically commensurate with rapid population growth across Epping.

Whilst the redevelopment of office buildings in the Town Centre have enabled residential growth, it has also displaced a significant number of commercial occupiers. It is understood that new tenants are offered restrictive lease terms - shorter terms often with demolition clauses. Larger businesses have relocated to centres such as Macquarie Park where they have obtained secure lease terms as well as better quality accommodation and building amenity.

Based on available leasing data, gross face rents for contemporary office space are in the order of $400/sqm to $500/sqm of internal area. Based on business occupier profile and activity, demand for commercial space is broader than just demand for office floorspace. The tenancy profile of businesses currently accommodated on the Site (various education and tutoring centres, specialist medical practices) is indicative of the spread of demand for commercial floorspace in the Town Centre.

Retail Land Uses

Retail activity in Epping is concentrated along its main throughfares of Beecroft Road, Oxford Street and Rawson Street. The retail market predominantly comprises restaurants and several independent grocers, many of which are Asian-oriented. Non-food retailers are limited and include several small-scale clothing stores.

Anchor occupiers include the Coles supermarket (located on the Site) and two Chemist Warehouse stores. Recently, new developments have also delivered modern, ground-floor retail floorspace within mixed use projects. Overall, the retail market in Epping comprises approximately 30,000sqm of floorspace (Arealytics, 2023) with a vacancy rate of less than 1%, indicating an undersupplied market.

Residents generally travel to Macquarie Park, Carlingford, Eastwood or Beecroft to have their convenience as well as higher order retail needs met.

A retail demand assessment (Location IQ, 2022) found that the amount of supermarket floorspace provided in the area surrounding the Site (i.e., its Main Trade Area) was less than *half* the Sydney benchmark (99sqm compared to 266sqm per 1,000 persons). This clearly indicated an undersupply of retail floorspace within the Main Trade Area.

The assessment identified demand for up to ~9,000sqm of retail floorspace across the Town Centre, inclusive of supermarkets, mini-major, retail specialties and non-retail uses (e.g. gym, childcare facilities, medical centre, tavern, etc.). As such, the proposed development for ~6,500sqm of retail and commercial floorspace would only *partially* address projected demand for retail floorspace within Epping.

Accordingly, the Proposal would not absorb all future demand, with additional development still needed moving forward.

3.3 Development Activity

A review of the development pipeline in Epping reveals that there are no notable commercial projects proposed in the locality. Proposed developments in Epping will predominantly deliver high density residential apartments, with a small quantum of retail and commercial floorspace within the developments.

Collectively, these developments could potentially deliver up to 6,440sqm of commercial floorspace and 1,970sqm of retail floorspace across seven projects in the Town Centre if delivered as proposed. Larger projects include:

- **2-4 Cambridge Street ('Epica Epping')**: 24-level mixed use development set to deliver some 1,170sqm of office space and 170sqm of retail space. Construction is expected to commence shortly with estimated completion late 2024.
- **52-54 Rawson Street and 48-54 Beecroft Road ('Epping Tower')**: 21-storey development delivering 123 residential units and 5 retail shops totalling 880sqm. Construction has yet to commence.
- **246-250 Beecroft Rd:** 15-storey mixed use development seeking to deliver 103 residential units, a 3,060sqm medical centre and 490sqm of retail floorspace. The proposal is in its early planning stages.
- **242-244 Beecroft Road:** three residential flat buildings (15-storeys each) set to comprise some 373 apartments and 905sqm of non-residential floorspace.

The newly completed mixed-use development at **12-22 Langston Place, Epping** has delivered some 2,000sqm of retail space in the Town Centre. Market investigations suggest that take-up has been positive, with no vacancies being advertised.

Overall, there are limited commercial and retail developments being progressed. New retail and commercial floorspace being delivered is generally 'tokenistic' and provided on the ground floor of predominantly residential developments.

Furthermore, several existing commercial buildings have been approved for demolition to accommodate residential development. This indicates that the market for commercial/retail land uses in Epping is likely to remain tight, with supply constrained in the short-medium term in the face of strong demand.

3.4 General Market Conditions

The Australian economy has been facing a heightened level of uncertainty over the past 12-24-months. Global upstream cost pressures resulting from the war in the Ukraine, pent-up COVID-related domestic demand and a resurgence in migration-driven population growth have resulted in a significant uptick in broad based inflation across the domestic economy. The labour market is tight and has contributed to wages growth amidst this inflationary backdrop.

In response, the Reserve Bank of Australia (RBA) has been tightening monetary policy with successive cash rate increases from 0.1% in April 2022 to 4.1% in June 2023. More rate rises are expected in the short-term as the RBA seeks to return inflation (pegged at 5.6% in May 2023) to its target range of 2%-3%. Rapid increases to interest rates have begun to affect many parts of the economy - notable declines in investment activity, household consumption and residential property values.

Against this backdrop, the property and development sector has been impacted to varying degrees over the past few years:

- Substantial rises in building costs over 2021-2022, resulting in an increase in **development delays and deferrals**.
- New **unit approvals have been declining since Q1 2021** and are now approaching levels observed in March 2012.
- Despite a softening in pricing, **demand for housing** remains strong given an uptick in population growth. This is most evident in the rental market, with a **chronic undersupply of rental properties** driving historically low vacancy rates.
- Structural change in working arrangements have driven a **sustained level of commercial office vacancy** across Greater Sydney with many commercial developers stalling or repositioning new office developments.
- Fewer office workers in the office during the week has resulted in **reduced demand for retail services in CBD office markets**, leading to increased vacancy of shopfront spaces in many office markets.
- **Structural change in shopping patterns** and the **accelerated take-up of online retail** has resulted in lower demand for shopfront retail space in some sectors. Increased vacancy rates are observed across Greater Sydney.
- **Demand for industrial land is at historic highs** - increased demand for urban logistics space from higher online retail penetration and a chronic shortage of industrial land resulting in rising rents and almost zero vacancy in Sydney.

The influence of economic conditions on property markets is nuanced. Trends resulting from the COVID-19 pandemic have 're-set' structural demand for some sectors. This has included:

- Reduction in demand for retail and commercial office floorspace.
- Increase in demand for industrial floorspace.

The re-setting of structural demand for space has direct implications for how sites are planned for future development.

3.5 Implications for the Town Centre

The COVID-19 pandemic has resulted in a structural shift to the demand for commercial office floorspace. Aggregate demand for office space has reduced overall and offices must now provide a better offer to meet market expectations. This has resulted in a preference for quality space and has rationalised demand to offices in high amenity locations. The structural change to working arrangements has further reinforced the rise in hyper localism and demand for localised retail facilities.

The Epping Town Centre is a centre in transition. The analysis in Chapter 2 shows that large scale development activity has resulted in:

- A much larger resident population, many of whom are well educated and who reside in younger households.
- A fall in employment as numerous former commercial buildings have been redeveloped over the past decade.
- Growth in the local education and training industries.

There is demand for a range of commercial floorspace in the Town Centre (broader than commercial office). This includes the need for retail space and commercial space for medical/ specialist practices, private colleges and tutoring centres.

Role for the Site

The retail demand assessment (Location IQ, 2022) identifies need for 9,000sqm of retail and non-retail space throughout the Town Centre. Delivery of retail facilities of this scale requires the co-location and clustering of retail uses to be viable.

Development across the Town Centre to date has not generated a significant amount of new commercial or retail floorspace. Many developments currently being progressed are on small sites, with limited capacity for large scale provision of retail/ commercial floorspace as identified in the retail demand assessment.

The Site therefore has an important role to play in meeting some of the projected demand for retail and commercial uses in the Town Centre. A contemporary retail and commercial offering as envisaged in the Proposal will significantly improve the retail amenity of the Town Centre, resulting in reduced 'escaped expenditure' (i.e. the proportion of retail expenditure being captured within the Town Centre).

4. Demand Assessment

4.1 Population Projections

Official population and demographic projections in NSW are carried out by the NSW Department of Planning and Environment (DPE). DPE's Demography and Research Unit project population growth on a variety of demographic assumptions, including birth and fertility rates, mortality rates, migration levels and household formation patterns. These projections of population growth are divided by projected household occupancy rates to arrive at the number of dwellings impliedly required to accommodate the projected population.

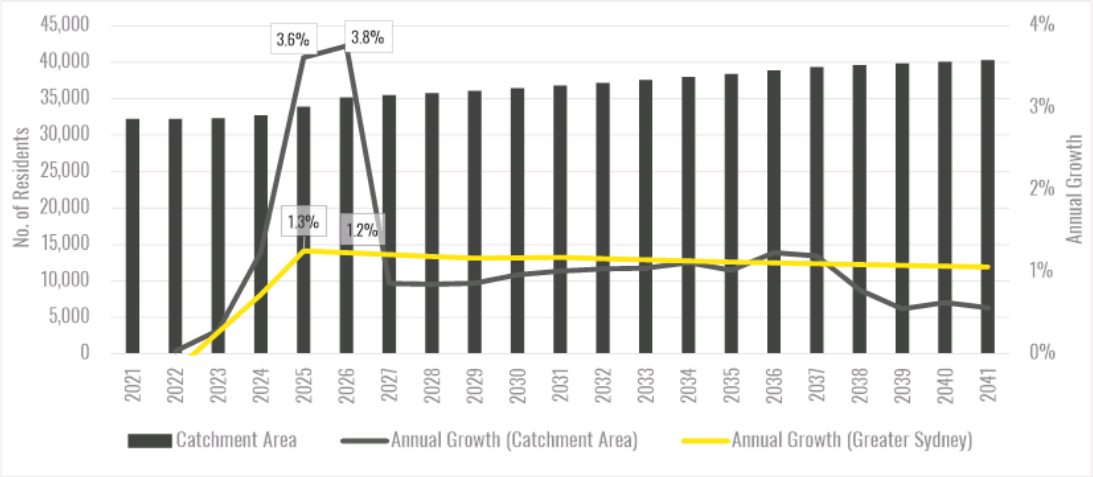
The most recent population projections prepared by DPE were released in 2022. These projections were prepared prior to the release of the 2021 Census are relied upon the ABS 2020 Estimated Resident Population (ERP) as a 'base' starting point. Projections were examined at the SA2 level which align with the boundaries of the Catchment Area.

Based on DPE population projections, the Catchment Area population is likely to grow by a notable ~4,600 residents in the coming decade to 2031. This is attributed to a period of marked growth expected to occur over 2024-2026, projected at an average annual rate of 3.7%. This is significantly higher than the 1.2% in Greater Sydney.

In the longer term to 2041, population growth in the Catchment Area is expected to grow steadily at an average annual rate of 1%, broadly aligned with that of Greater Sydney. Much of the projected growth is expected to occur in the Town Centre, with the rest of the Catchment Area comprised of lower density areas.

Figure 4.1 illustrates the projected population of the Catchment Area over the coming two decades.

Figure 4.1: Population Projections (2021-2041), Catchment Area



Source: DPE (2022)

4.2 Employment Projections

Employment projections relied upon in this Study are prepared by Transport for NSW's Transport, Performance and Analytics (TPA) Division. These projections are carried out at a small area level in geographies known as Travel Zones (TZs). A series of TZs which broadly align with the Town Centre Area have been selected to be the focus of analysis.

Based on the employment projections, the Town Centre could expect an additional **150 workers** in the coming decade to 2031, and a further **190 workers** over 2031-2041. Employment projections to 2031 include:

- +58 workers in health and education industries (38% of additional jobs).
- No change in industrial sectors.
- +103 workers in knowledge-intensive industries (67% of additional jobs).
- -7 workers in population serving industries (-5% of additional jobs).

Table 4.1 provides a detailed breakdown of employment projections by BIC in the Town Centre over 2021-2041.

Table 4.1: Employment Projections, Town Centre Employment (2021-2041)

Broad Industry Classification (BIC)	2021		2031		2041		Change (No.)	
	No.	%	No.	%	No.	%	2021-31	2031-41
Health and Education	723	22%	781	23%	819	23%	58	38
Industrial	106	3%	106	3%	114	3%	0	8
Knowledge Intensive	1,490	46%	1,593	47%	1,686	47%	103	93
Population Serving	914	28%	907	27%	960	27%	-7	53
Total	**3,233**	**100%**	**3,386**	**100%**	**3,579**	**100%**	**153**	**193**

Source: TPA (2019)

In the coming decades, employment in the Town Centre is expected to be driven by growth in health and education and knowledge-intensive industries. By 2031, these industries could account for 70% of jobs in the Town Centre (~2,370 jobs).

Demand for Employment Floorspace

The floorspace required to accommodate projected employment growth in the Town Centre Employment can be estimated through converting employment (jobs) into floorspace using workspace ratios (i.e. the amount of floorspace occupied per worker). The NSW Government provides a set of benchmark workspace ratios which can be used across Greater Sydney (Landcom, 2018). Atlas has refined this set based on past experience and industry knowledge.

The conversion of employment projections into floorspace suggests the Town Centre could require an additional **~5,040sqm** over the coming decade. By 2031, total demand for floorspace could reach **~140,200sqm** and comprised of:

- 31,200sqm (22%) for health and education.
- 15,800sqm (11%) for industrial.
- 47,800sqm (34%) for knowledge-intensive industries.
- 45,300sqm (32%) for population serving industries.

Table 4.2 summarises the employment floorspace projections for the Town Centre Catchment over 2021-2041.

Table 4.2: Potential Floorspace Demand (2021-2041), Town Centre Catchment

Broad Industry Classification (BIC)	2021	2026	2031	2036	2041	Change (No.)	
						2021-31	2031-41
Health and Education	28,912	30,791	31,235	31,716	32,761	2,323	1,526
Industrial	15,839	15,107	15,830	16,514	17,066	-9	1,236
Knowledge Intensive	44,706	47,962	47,795	49,191	50,572	3,089	2,777
Population Serving	45,706	45,433	45,345	46,729	48,022	-361	2,677
Total	**135,163**	**139,294**	**140,204**	**144,151**	**148,421**	**5,042**	**8,217**

Source: Atlas Economics/TPA (2019)

In the coming decade to 2031, the employment projections suggest that demand for floorspace is likely to be driven by knowledge-intensive (+3,089sqm) and health and education industries (+2,323sqm).

Implications for the Town Centre

The population projections suggest that the Catchment Area resident population is expected to grow significantly in the immediate term to 2026. This implies that demand for retail and local business services will grow commensurately.

Employment in the Catchment Area is expected to grow modestly at 150 jobs to 2031, with an additional 5,040sqm of floorspace potentially required. Over the longer term between 2031 and 2041, a further 8,220sqm could be required.

The expectations of employment growth are relatively modest and likely reflective of expectations that the Town Centre is transitioning from historically a minor office market to a commercial services centre focused on a new resident community.

5. Economic Impact Assessment

5.1 Overview and Approach

This chapter examines the economic activity and impacts that could be facilitated through progression of the Proposal during construction and upon completion. The analysis estimates the economic activity supported in the following scenarios:

- **Base Case**

  The Site continues to operate as a shopping centre with a full-line Coles supermarket (3,300sqm of retail floorspace) and commercial building (4,756sqm of commercial floorspace).

- **Proposal Case**

  The Site is developed as per the Proposal, comprising a mix of land uses across two 33 and 36 storey towers including:

  - 7,430sqm commercial floorspace.
  - 6,247sqm retail floorspace (3,100sqm supermarket, 3,147sqm retail specialties).
  - Up to 420 apartments;

The economic impacts are assessed at the Parramatta LGA level. An Input-Output model (including the development of specific regional Input-Output transaction tables) was developed to reflect the economic structure of the Parramatta LGA (see Schedule 1 for further detail).

Input-Output modelling considers economic activity through examining four types of impacts as described in **Table 5.1**.

Table 5.1: Economic Indicators

Indicator	Description
Output	The gross value of goods and services transacted, including the cost of goods and services used in the development and provision of the final product. Care should be taken when using output as an indicator of economic activity as it counts all goods and services used in one stage of production as an input to later stages of production, thus overstating economic activity.
Gross Product	The value of output after deducting the cost of goods and services inputs in the production process. Gross product (e.g. Gross Regional Product (GRP)) defines a net contribution to economic activity.
Incomes	The wages and salaries paid to employees as a result of the Project either directly or indirectly.
Employment	Employment positions generated by the Project (either full time or part time, directly or indirectly). Employment is reported in terms of Full-time Equivalent (FTE) positions or person-years.

Source: Atlas

Input-Output modelling estimates show the impacts of direct spending in a particular industry as well as from Production-induced impacts (Type I) or Consumption-induced impacts (Type II).

- **Production-induced impacts (Type I)** show the effects of industrial support effects of additional activities undertaken by supply chain industries increasing their production in response to direct spending.
- **Consumption-induced impacts (Type II)** estimate the re-circulation of labour income earned as a result of the initial spending through other industry impacts (or impacts from increased household consumption).

The estimates of economic impacts consider production and consumption-induced flow-on impacts. Type II impacts are commonly considered to overstate economic activity and therefore the types of flow-on impacts are reported separately.

5.2 Drivers of Economic Activity

To understand the economic impacts likely to result from the Proposal compared to the Base Case, it is necessary to distinguish economic impacts during the construction phase and those economic impacts that will be more permanent in nature following construction completion and operations commencement and stabilisation to long run averages.

- **Construction Phase:** Construction activity will draw resources from and thereby generate economic activity in the Parramatta economy as well as from outside Parramatta LGA.

  Assumptions are made on the proportion sourced from within and from outside Parramatta. The construction phase is assessed for the Proposal Case only.

- **Operational Phase:**
  - **Base Case:** The Site will continue to accommodate a supermarket and office building and generate direct employment within these facilities.
  - **Proposal Case:**
    - The Site will generate additional ongoing employment activity and dispersed employment through persons working from home in the new residential dwellings.
    - The Site will facilitate additional household expenditure through the 420 new dwellings.

Refer to Schedule 1 for a description of the drivers and assumptions that underpin the assessed economic impacts.

5.3 Economic Activity and Impacts

Construction Phase

During construction the Proposal Case is projected to generate significant economic impacts for Parramatta, including:

- **$407.1 million** in output (including $237.8 million in direct activity).
- **$147.4 million** contribution to GRP (including $60.6 million in direct activity).
- **$83.0 million** in incomes and salaries paid to households (including $40.3 million in direct income).
- **855 FTE jobs** (including 449 FTE directly employed in construction activity).

Economic impacts during construction are summarised in **Table 5.2**. It should be noted that construction impacts are reported in total for the construction phase, and do not represent an average annual estimate.

Table 5.2: Construction Impacts in Parramatta LGA, Proposal Case

Indicator	Output ($M)	GRP ($M)	Incomes ($M)	Employment (FTE)
Direct	$237.8	$60.6	$40.3	449
Flow-on Type I (Production-induced)	$102.4	$47.0	$27.0	243
Flow-on Type II (Consumption-induced)	$67.0	$39.8	$15.8	163
Total	**$407.1**	**$147.4**	**$83.0**	**855**

Note: Totals may not sum due to rounding.
Source: Atlas

Operational Phase

Following the completion of construction, the Proposal Case is estimated to support the following annual economic activity through direct and indirect (flow-on) impacts associated with operations (and dispersed employment) on the Site:

- **$272.1 million** in output (including $159.2 million in direct activity).
- **$148.4 million** contribution to GRP (including $86.0 million in direct activity).
- **$76.2 million** in incomes and salaries paid to households (including $47.4 million in direct income).
- **756 ongoing FTE jobs** (including 485 FTE directly related to activity on the Site).

Table 5.3 summarises the estimated economic impacts during the operational phase in both the Base and Proposal Case.

Table 5.3: **Operational Impacts in Parramatta LGA, Base Case and Proposal Case**

Indicator	Output ($M)	GRP ($M)	Incomes ($M)	Employment (FTE)
Base Case				
Direct	$70.7	$39.2	$15.7	174
Flow-on Type I (Production-induced)	$15.9	$7.9	$4.4	38
Flow-on Type II (Consumption-induced)	$21.3	$12.7	$5.0	52
Total	**$107.9**	**$59.8**	**$25.1**	**264**
Proposal Case				
Direct	$159.2	$86.0	$47.4	485
Flow-on Type I (Production-induced)	$48.2	$24.1	$13.6	114
Flow-on Type II (Consumption-induced)	$64.7	$38.4	$15.2	157
Total	**$272.1**	**$148.4**	**$76.2**	**756**
Net Operational Impacts				
Direct	$88.5	$46.8	$31.7	311
Flow-on Type I (Production-induced)	$32.3	$16.1	$9.2	76
Flow-on Type II (Consumption-induced)	$43.4	$25.7	$10.2	105
Total	**$164.2**	**$88.6**	**$51.1**	**493**

Note: Totals may not sum due to rounding.
Source: Atlas

Compared with the Base Case, the Proposal Case facilitates a notably intensified use of the Site, accommodating more businesses and employment activity, resulting in greater levels of output and contribution to the local economy.

The Proposal is estimated to result in **a net increase in economic activity** through direct and indirect (flow-on) annually at:

- **$164.2 million** additional in output (including $88.5 million in direct activity).
- **$88.6 million** additional in contribution to GRP (including $46.8 million in direct activity).
- **$51.1 million** additional incomes and salaries paid to households (including $31.7 million directly).
- **493 additional FTE jobs** (including 311 additional FTE jobs directly related to activity on the Site).

The economic impacts estimated in this section demonstrates the Proposal has economic merit, having the ability to contribute significantly to the local economy.

Household Expenditure Impacts

In addition to the commercial activity estimated above, the Proposal Case is projected to generate additional household expenditure supported through new dwellings within the Parramatta LGA. This activity is estimated to support on an ongoing annual basis (once fully developed and occupied):

- **$59.7 million** in total output ($35.2 million directly).
- **$34.7 million** contribution to GRP ($21.2 million directly).
- **$14.6 million** in wages and salaries to local workers ($8.4 million directly).
- **187 FTE jobs** (128 direct FTE).

Table 5.4 shows the estimates of economic activity associated with household expenditure. It should be noted that operational and household impacts are not additive, due to potential for double counting of economic impacts (for example, household spending will result in direct and flow-on activity for businesses that are operating within the Site).

Table 5.4: Housheold Expenditure Impacts in Parramatta LGA, Proposal Case

Indicator	Output ($M)	GRP ($M)	Incomes ($M)	Employment (FTE)
Direct	$35.2	$21.2	$8.4	128
Flow-on Type I (Production-induced)	$10.8	$5.4	$2.9	26
Flow-on Type II (Consumption-induced)	$13.6	$8.1	$3.2	33
Total	**$59.7**	**$34.7**	**$14.6**	**187**

Note: Totals may not sum due to rounding.
Source: Atlas

5.4 Summary of Economic Findings

The development of the Proposal is shown to deliver significant and positive economic impacts to the Greater Sydney economy. Compared with the Base Case, it is estimated to result in **a net increase in economic activity** during the construction phase through a mix of direct and indirect (flow-on) activity, including:

- **$407.1 million** in output (including $237.8 million in direct activity).
- **$147.4 million** contribution to GRP (including $60.6 million in direct activity).
- **$83.0 million** in incomes and salaries paid to households (including $40.3 million in direct income).
- **855 FTE jobs** (including 449 FTE directly employed in construction activity).

When operational, the Proposal is estimated to result in an annual **net increase in economic activity** with:

- **$164.2 million** additional in output (including $88.5 million in direct activity).
- **$88.6 million** additional in contribution to GRP (including $46.8 million in direct activity).
- **$51.1 million** additional incomes and salaries paid to households (including $31.7 million directly).
- **493 additional FTE jobs** (including 311 additional FTE jobs directly related to activity on the Site).

The Proposal will also facilitate notable household expenditure impacts through providing new housing stock:

- **$59.7 million** in total output ($35.2 million directly).
- **$34.7 million** contribution to GRP ($21.2 million directly).
- **$14.6 million** in wages and salaries to local workers ($8.4 million directly).
- **187 FTE jobs** (128 direct FTE).

The economic impacts estimated in this Chapter demonstrates the Proposal will deliver significant positive economic benefits, having the ability to contribute significantly to the Parramatta economy over the long-term.

Economic modelling indicates the Proposal will make a significant contribution to the Parramatta economy. The Proposal is expected to generate an annual GRP of $148.4 million to the local economy and support almost 485 FTE jobs on-site.

The Proposal will contribute to meeting demand for retail and local commercial services including the growing health and education-related sectors seeking to meet the growing needs of the local population. The Proposal will facilitate reduced 'escaped expenditure' and travel to other centres.

Importantly, the Proposal will contribute to a much-need increase in contemporary commercial floorspace within the Epping Town Centre. As such, it aligns with the expected role of Epping as a major employment and business hub that capitalises on improved transport links as identified in the *Draft Parramatta Economic Development Strategy* (City of Parramatta, 2023).

Overall, the Proposal is considered to have clear economic and market merit and will assist the Epping Town Centre continue in its transition to a service-based centre. It is recommended that the City of Parramatta support the Proposal, subject to other technical findings.

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Schedules

SCHEDULE 1

Input-Output Modelling Methodology

Input-Output models are a method to describe and analyse forward and backward economic linkages between industries based on a matrix of monetary transactions. The model estimates how products sold (outputs) from one industry are purchased (inputs) in the production process by other industries.

The analysis of these industry linkages enables estimation of the overall economic impact within a catchment area due to a change in demand levels within a specific sector or sectors.

Impacts are traced through the economy via:

- Direct impacts, which are the first round of effects from direct operational expenditure on goods and services.
- Flow-on impacts, which comprise the second and subsequent round effects of increased purchases by suppliers in response to increased sales. Flow-on impacts can be disaggregated to:
    - Industry Support Effects (Type I) derived from open Input-Output models. Type I impacts represent the production induced support activity as a result of additional expenditure by the industry experiencing the stimulus on goods and services, and subsequent round effects of increased purchases by suppliers in response to increased sales.
    - Household Consumption Effects (Type II) derived from closed Input-Output Models. Type II impacts represent the consumption induced activity from additional household expenditure on goods and services resulting from additional wages and salaries being paid within the catchment economy.

Economic analysis considers the following four types of impacts.

Table S1-1: Economic Activity Indicators

Indicator	Description
Output	The gross value of goods and services transacted, including the cost of goods and services used in the development and provision of the final product. Care should be taken when using output as an indicator of economic activity as it counts all goods and services used in one stage of production as an input to later stages of production, thus overstating economic activity.
Gross Product	The value of output after deducting the cost of goods and services inputs in the production process. Gross product (e.g. Gross Regional Product (GRP)) defines a net contribution to economic activity.
Incomes	The wages and salaries paid to employees as a result of the Project or Proposal either directly or indirectly.
Employment	Employment positions generated by the Project or Proposal (either full time or part time, directly or indirectly). Employment is reported in terms of Full-time Equivalent (FTE) positions or person-years.

Source: Atlas

Regional Model Development

Multipliers used in this assessment have been created using a regionalised Input-Output model derived from the 2020-2021 Australian transaction table (ABS, 2023a).

Estimates of gross industry production in the catchment area were developed based on the share of employment (by place of work) of the catchment area within the Australian economy (ABS, 2022) using the Flegg Location Quotient and Cross Hauling Adjusted Regionalisation Method (CHARM). See Norbert (2015) and Kronenberg (2009) for further details. Where required, values were indexed to current dollar values using CPI (ABS, 2023b).

Modelling Limitations and Assumptions

Input-Output modelling is subject to a number of key assumptions and limitations (ABS, 2023a):

- **Lack of supply–side constraints:** The most significant limitation of economic impact analysis using multipliers is the implicit assumption that the economy has no supply–side constraints. That is, it is assumed that extra output can be produced in one area without taking resources away from other activities, thus overstating economic impacts. The actual impact is likely to be dependent on the extent to which the economy is operating at or near capacity.
- **Fixed prices:** Constraints on the availability of inputs, such as skilled labour, require prices to act as a rationing device. In assessments using multipliers, where factors of production are assumed to be limitless, this rationing response is assumed not to occur. Prices are assumed to be unaffected by policy and any crowding out effects are not captured.
- **Fixed ratios for intermediate inputs and production:** Economic impact analysis using multipliers implicitly assumes that there is a fixed input structure in each industry and fixed ratios for production. As such, impact analysis using multipliers can be seen to describe average effects, not marginal effects. For example, increased demand for a product is assumed to imply an equal increase in production for that product. In reality, however, it may be more efficient to increase imports or divert some exports to local consumption rather than increasing local production by the full amount.
- **No allowance for purchasers' marginal responses to change:** Economic impact analysis using multipliers assumes that households consume goods and services in exact proportions to their initial budget shares. For example, the household budget share of some goods might increase as household income increases. This equally applies to industrial consumption of intermediate inputs and factors of production.
- **Absence of budget constraints:** Assessments of economic impacts using multipliers that consider consumption induced effects (type two multipliers) implicitly assume that household and government consumption is not subject to budget constraints.

Despite these notable limitations, Input-Output techniques provide a solid approach for assessing the direct and flow on economic impacts of a project or policy that does not result in a significant change in the overall economic structure.

Drivers of Economic Impact

In order to understand the economic impacts likely to result from the Proposal, it is necessary to distinguish economic impacts during the construction phase and those economic impacts that will be more permanent following construction completion.

- **Construction Phase:** Construction activity will draw resources from and thereby generate economic activity in the Parramatta economy as well as from outside Parramatta LGA.

  Assumptions are made on the proportion sourced from within and from outside Parramatta. The construction phase is assessed for the Proposal Case only.

- **Operational Phase:**
  - **Base Case:** The Site will continue to accommodate a supermarket and office building and generate direct employment within these facilities.
  - **Proposal Case:**
    - In addition to employment generated from the new retail and commercial office floorspace, the Site will generate additional ongoing employment activity and dispersed employment through persons working from home in the 420 dwellings.
    - The Site will facilitate additional household expenditure through the 420 new residential dwelling units.

Construction Phase

For modelling purposes, construction costs (including contingency) for the Proposal Case were broken down into their respective Australian and New Zealand Standard Industrial Classification (ANZSIC) industries.

The breakdowns were developed based on the following assumptions by Atlas regarding the most appropriate ANZSIC industries for each activity.

Table S1-2: Construction Cost Allocation (including Contingency)

Item	Cost ($M)	ANZSIC
Demolition	$0.9	Construction Services
Residential Units	$191.0	Residential Building Construction
Retail	$9.9	Non-Residential Building Construction
Commercial	$23.0	Non-Residential Building Construction
Mall	$0.0	Non-Residential Building Construction
Supermarket	$9.8	Non-Residential Building Construction
Amenities	$0.0	Non-Residential Building Construction
Basement Spaces	$47.9	Non-Residential Building Construction
Site Costs	$5.7	Heavy and Civil Engineering Construction
Professional Fees	$28.8	Professional, Scientific and Technical Services
Total	**$317.0**	-

Note: numbers may not sum due to rounding
Source: Atlas

Of the above capital outlay, not all activity will be undertaken within the Parramatta LGA economy. It was assumed:

- Approximately 75% of the direct expenditure on construction-related activity would be sourced from local businesses and labour. Of this:
    - Approximately 25% of purchases on goods and services (supply chain related activity) made by construction-related businesses sourced from outside Parramatta would be spent within the local economy (i.e., 25% of the Type I flow on activity associated with non-local construction companies is assumed to represent additional local activity in Parramatta).
    - Approximately 5% of wages and salaries paid to construction-related workers sourced from outside the region would be spent on local goods and services, such as food and beverages (i.e. 5% of the Type II).

Only flow-on activity of locally sourced professional, scientific and technical services activity (75%) is included, as it is not anticipated professional, scientific and technical services businesses located outside of Parramatta would purchase goods/ services locally.

Operational Phase

In order to model the economic impacts, operational employment levels for the economic activity occurring in Base and Proposal Case were categorised into the ANZSIC industries.

In the Base Case, employment was estimated based on current uses within the Site (i.e. existing supermarket, specialty retail and various commercial office uses).

In the Proposal Case, employment was estimated through converting the floorspace envisaged in the Proposal with industry standard workspace ratios (Landcom, 2019, Atlas estimates). Estimates were also generated for potential dispersed employment (i.e. residents working form home) within the Proposal Case.

Employment by industry estimates were converted to a direct output value using a multiplier based on the transaction tables developed for this assessment (ABS, 2023a). The resultant estimates of output were modelled as the direct activity associated with the Base Case and Proposal Cases.

Table S1-3: Operational FTE Allocation of Floorspace

Use/ANZSIC	GFA (sqm)	Floorspace (sqm/FTE)	Employment (FTE)	Output ($M)
Base Case				
Education and Training	4,014	80	50	$9.0
Rental, Hiring and Real Estate Services	235	20	12	$9.1
Construction	211	20	11	$6.5
Health Care and Social Assistance	563	80	7	$1.3
Professional, Scientific and Technical Services	208	20	10	$3.0
Retail Trade	4,180	50	84	$41.8[1]
Total	**9,412**	**54**	**174**	**$70.7**
Proposal Case				
Retail Trade (supermarket)	3,100	50	62	$39.6[1]
Retail Trade (specialty retail)	1,574	30	52	
Food and Beverage Services (specialty retail)	1,574	30	52	$5.2
Commercial Space (ANZSIC split as per SA2 Catchment Area Place of Work Employment)	7,301	25	292	$95.5
Dispersed Employment (ANZSIC split as per SA2 Catchment Area Place of Usual Residence Employment)	535 workers[2]	5% work from home[3]	27	$10.6
Total	**13,549**		**485**	**$150.9**

Notes: Totals may not sum due to rounding. [1] Turnover adjusted for supermarket space productivity of $10,000/sqm. [2] Calculated assuming an average 2% vacancy, 1.3 FTE workers per household. [3] A conservative estimate considering post-COVID trends. .
Source: Atlas

Household Expenditure

This section outlines the household expenditure that would be associated with the new dwellings proposed as part of the Proposal Case, and potential economic activity supported.

The household expenditure activity supported should not be combined with the impacts in the section above, as some of these impacts are likely to have already been captured in the assessment (e.g. some expenditure on retail and food and beverages by households is likely to spent at the outlets locating on the Site).

This section is to understand specific economic activity supported in Parramatta LGA through household expenditure as its own separate analysis.

The ABS Household Expenditure Survey (ABS, 2017) was used to identify the proportion of weekly household incomes that are spent across expenditure items in the Parramatta LGA. The fourth quintile of NSW residents was used to best represent the expenditure patterns of residents in the surrounding catchment area.

The household survey only contains household expenditure data, and individual residents must be converted to an equivalent number of households. This was achieved by applying the estimated number of dwellings (420) and a vacancy rate of 2% (representative of the current rental market).

This data was converted to 2023 values (ABS, 2023b), annualised and allocated into their respective ANZSIC industries. The breakdown to ANZSIC industries was developed based on assumptions by Atlas regarding the most appropriate ANZSIC industries for each activity.

Table S1-4 shows the household expenditure estimates for the Parramatta LGA under the Proposal Case.

Table S1-4: Housheold Expenditure Estimates (Proposal Case)

ANZSIC	Total Spend ($M)	% Spent in Parramatta LGA	Local Spend ($M)
Ownership of Dwellings	$9.0	100%	$9.0
Retail Trade	$8.5	80%	$6.8
Food and Beverage Services	$4.5	80%	$3.6
Personal Services	$2.5	75%	$1.8
Other Services	$2.7	70%	$1.9
Telecommunication Services	$1.5	60%	$0.9
Road Transport	$4.1	80%	$3.3
Rail Transport	$2.1	50%	$1.0
Air and Space Transport	$0.7	20%	$0.1
Sports and Recreation	$3.5	75%	$2.6
Primary and Secondary Education Services (incl Pre-Schools and Special Schools)	$0.5	75%	$0.4
Technical, Vocational and Tertiary Education Services (including Undergraduate and Postgraduate)	$0.4	75%	$0.3
Arts, Sports, Adult and Other Education Services (including Community Education)	$0.1	75%	$0.1
Health Care Services	$2.3	80%	$1.8
Heritage, Creative and Performing Arts	$1.5	80%	$1.2
Electricity Transmission, Distribution, On Selling and Electricity Market Operation	$0.5	60%	$0.3
Total	**$44.3**	**79%**	**$35.2**

Notes: Totals may not sum due to rounding.
Source: ABS (2017), Atlas

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Atlas ECONOMICS
ANALYSIS. INSIGHTS. OUTCOMES.

Project:	*Epping Town Centre – Flood Assessment for Planning Proposal*
Project ID:	*210046*
Date:	*24 April 2024*
To:	*Oakstand, Justin Micallef*
Subject:	*April 2024 Revision of Plans*
Version:	*V01*
Author:	*Tomas Steele, Senior Engineer*
Reviewer:	*Stephen Gray, Director*
Authorised by:	*Stephen Gray, Director*

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RE: Epping Town Centre – Flood Assessment for Planning Proposal. April 2024 Revision of Plans

GRC Hydro have previously issued a detailed flood risk assessment for a proposed development "Epping Town Centre" at the corner of Rawson Street and Carlingford Road, Epping (the subject site) in the 'Epping Town Centre, Flood Assessment for Planning Proposal', Revision C, GRC Hydro, 5th December 2023 (the flood assessment (GRC Hydro, 2023)). The assessment showed full compliance with the:

- Parramatta Development Control Plan (DCP, 2023);
- Parramatta Local Environmental Plan (LEP, 2023);
- Ministerial Direction 4.1; and
- Flood impact and risk assessment, Flood risk management guideline LU01 (DPE, 2023).

The flood assessment (GRC Hydro, 2023) was based on architectural plans by Oakstand dated 12th May 2023. Oakstand have since updated the plans and provided them via email correspondence on the 23rd April 2024 for comment from GRC Hydro.

GRC Hydro have reviewed the plans and noted no changes that would change the previously presented report or conclusions, as summarised in further detail below. As such, there is no need to update either the modelling or reporting presented in the 'Epping Town Centre, Flood Assessment for Planning Proposal', Revision C, GRC Hydro, 5th December 2023 and this document remains the detailed flood risk assessment for the proposed "Epping Town Centre".

Yours Sincerely,

Steve Gray

Director

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Summary of Flood Risk Assessment

The flood assessment (GRC Hydro, 2023) was conducted using detailed hydrologic and hydraulic modelling of existing catchment conditions and post-development catchment conditions for a wide range of design flood events including the 5% AEP, 1% AEP, 0.5% AEP and PMF. Flood inundation depths, peak floodwater levels, velocities, AIDR hazard category classification and flood function were presented and used to inform a detailed risk assessment of the proposed development's potential impact on the community, infrastructure and the users of the proposed "Epping Town Centre".

It was found the proposed "Epping Town Centre" was a very low flood risk to the community and flooding poses a low risk to both the building and its users, with residual risks manageable through proper emergency management planning. Key items contributing to the assessment were:

- The basement has a passive level of protection to the 1% AEP + 500mm freeboard through the raised entrance crest.
- The basement has a level of protection to the PMF provided through the proposed flood gates.
- The first level with pedestrian access to outside of the site is Ground Floor G which is above the 1% AEP + freeboard and the PMF flood level.
- All floors above Ground Floor G are residential and protected to well above the PMF flood level.
- A shelter-in-place strategy would be the safest approach to protect people during a flood since:
    - The proposed building is safe from the ingress of floodwater for all events.
    - The site has a very short warning time, and a short duration of inundation.

April 2024 Architectural Changes

The flood assessment (GRC Hydro, 2023) was based on architectural plans by Oakstand dated 12th May 2023. Oakstand have since updated the plans and provided them via email correspondence on the 23rd April 2024 for comment from GRC Hydro. GRC Hydro have the following observations and comments:

- Level 1 plan and above has changed to two towers rather than three. This change has no bearing on the previous flood assessment as the levels above Ground Floor G do not interact with floodwater and provide a similar vertical refuge benefit as previously assessed.
- Ground Floor G arrangement has changed, but still maintains an 88.5m AHD ground level and covers the same extent used for the building representation in the previous assessment. As such, the previous hydraulic model representation is still correct and the results, mapping and conclusions drawn from them are still valid.
- The Lower Ground LG is virtually the same with the same layout and carpark entrances to the basement locations and crest heights remain unchanged. Two differences are noted:
    - The service vehicle access has been extended onto Carlingford Rd. Oakstand have provided the following comment on this change in email correspondence on the 18th April 2024:

> *"Council has agreed to retain the western DCP laneway along the western boundary in the flood affected area, for the use of service vehicles only during non-flood conditions. Flood warning devices will need to be installed and boom gates, bollards, etc will need to be designed and installed to allow the automatic closure of the laneway in a flood event. This will be resolved in detail at DA stage but important for you to know [Council] have now agreed to retain this access point."*

The noted change does not change the outcomes of the hydraulic model, and the comments from Oakstand have removed the risk associated with the entrance sufficiently to not warrant an update to the previous risk assessment. As such the outcomes of the previous risk assessment, including the evacuation assessment, remain unchanged.

- Road grades remain virtually unchanged, with a very minor variation noted that is too small to be represented in the hydraulic modelling. As such, the previous hydraulic model representation is still correct and the results, mapping and conclusions drawn from them are still valid.

Conclusion

The observations and comments above let us conclude that based on the information presented to GRC Hydro that the flood assessment (GRC Hydro 2023), including the risk assessment and outcomes, are still valid with the proposed changes provided by Oakstand on the 23rd April 2024. No changes have been proposed to the key items contributing to the conclusion of the proposed "Epping Town Centre" being of a low flood risk. As such, there is no need to update either the modelling or reporting presented in the 'Epping Town Centre, Flood Assessment for Planning Proposal', Revision C, GRC Hydro, 5th December 2023.

Yours Sincerely,

Steve Gray

Director

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Epping Town Centre

Flood Assessment for Planning Proposal

Oakstand

December 2023

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Epping Town Centre
Flood Assessment for Planning Proposal

Project:	Epping Town Centre
Subject:	Flood Assessment for Planning Proposal
Project Number:	210046
Date:	5 December 2023
Client:	Oakstand
Client Contact:	Justin Micallef
Report Ver:	Revision C
Status:	Draft
Report Author:	Feiya He B. Eng Matthew Faint BEng (Civil & Env), Engineer Tomas Steele B. Eng
Reviewed/Approved:	Stephen Gray BE ME, Director

1. Executive Summary

Development, "Epping Town Centre" is proposed at the corner of Rawson Street and Carlingford Road (the subject site). The site is affected by flooding due to its proximity to Boronia Park Main Channel (the channel).

Pertinent background is that in 2021 Parramatta Council submitted a Planning Proposal for the greater Epping Town Centre, seeking to amend the Planning controls to require a minimum 1:1 non-residential uses for strategic sites within the town centre, in addition to the current floor space control. This proposal was not supported by the Department of Planning.

The proponent Oakstand seeks to submit a new Planning Proposal to achieve the same intent of the 1:1 non-residential floor space proposed by council, but for the subject site in isolation. The proposed development layout is as it was when GRC Hydro completed their 2021 flood report. A feature of the 2021 work was that GRC Hydro had worked with the proponent to ensure a development that was compliant with all applicable controls (Council DCP and LEP).

This revised report provides the following content:

- A summary of the subject site's hydrologic and topographic context;
- Details on model build work (both hydrologic and hydraulic models have been developed) including a blockage assessment undertaken in line with best practice;
- Flood model results including flood depths, levels, hazard and hydraulic categories;
- Features of the proposed works as they are relevant to the flood situation (for example floor levels, access etc.);
- How the development complies with Council LEP and DCP and also Ministerial Direction 4.1.
- Mapping, results and risk assessment covering the scope from the 'Flood impact and risk assessment, Flood risk management guideline LU01' (DPE 2023)

2. Introduction

GRC Hydro Pty Ltd have been engaged to undertake a flood assessment for Epping Town Centre, the corner of Rawson Street and Carlingford Road (the site). The site is affected by flooding due to its proximity to Boronia Park Main Channel (the channel). Hydrologic and hydraulic models have been established to understand the flood behaviour in a range of flood events, and to assess flood risk at the site in both the existing case and considering the potential impact of the proposed development. The results of this flood modelling have been used to assess the proposed development's compliance with flood planning controls applicable to the site based on the following planning instruments and guidelines:

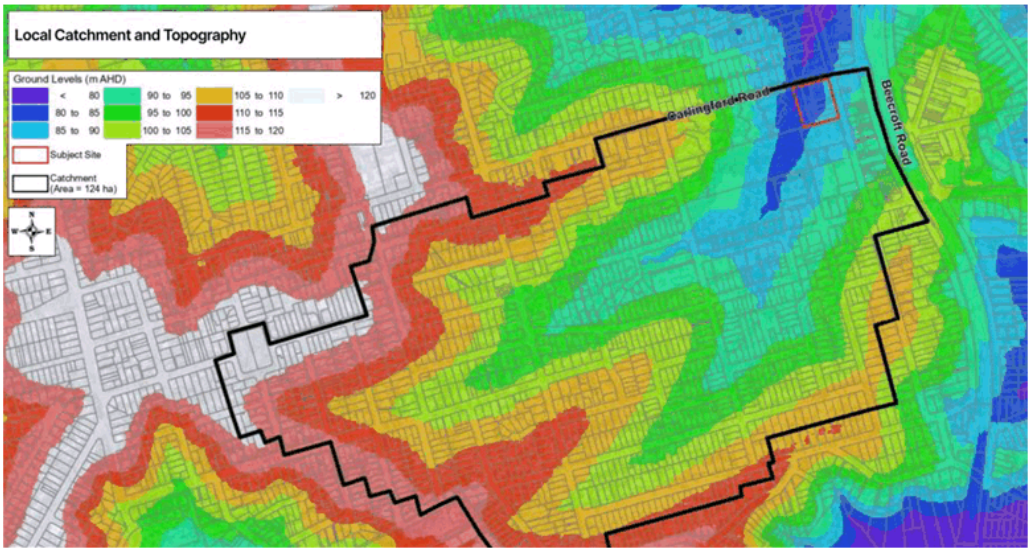
- The Parramatta Development Control Plan (DCP 2023);
- The Parramatta Local Environmental Plan (LEP 2023);
- Ministerial Directions 4.1; and,
- Flood impact and risk assessment, Flood risk management guideline LU01 (DPE 2023)

3. The Site

The site location is shown in Image 1 below. The catchment draining to the site is 124 hectares. The channel is immediately adjacent to the site, to the southwest, and consists of a concrete engineered channel.

The catchment area consists mostly of medium density urban areas with areas of parkland. The catchment has areas of relatively steep grade.

Image 1 – Local Catchment and Topography



4. Existing Flood Affectation

The site is affected by mainstream flooding from Boronia Park Channel, and negligible overland flooding/drainage. Mainstream flooding occurs when the channel that passes through the site from south to north has its capacity exceeded. The channel at the site has a catchment of 124 hectares, which extends south from the site by approximately 1.5 km over predominantly residential land. Flooding can be exacerbated due to Carlingford Road which is slightly higher than parts of the site. Overland flooding at the site occurs when localised rainfall causes flooding on Rawson Street, with some flow then spilling onto the site towards the channel.

Design flood behaviour has been established by a hydrologic and hydraulic model of the area setup as part of this assessment. The 5% AEP, 1% AEP, 0.5% AEP and PMF design flood events have been simulated. Further details in Section 5, including mapping, water level profiles and tabulated values.

In summary then the site is impacted by:

- Mainstream flooding associated with overflow from the channel – this overflow from the channel will depend on blockage rate used at the Carlingford Road culvert; and
- Overland flow flooding with water running down from Rawson Street toward the channel. This overland flow is extremely shallow (less than 150 mm in the main) and is very low hazard (H1 in 1% AEP event) and as such does not endanger anyone (even elderly and small children and small cars are safe in H1).

Section 6 and 7 present the proposed development, including mapping, tabulated values and hydrographs for proposed conditions. The impacts on both levels and hazards are also presented.

Section 8 discusses the flood risk management for the site based on the presented results. This includes results and discussion on climate change. Given the proposed development includes basement car parks, with entrances facing the channel, the key issue for flood risk management at the site are:

1. Ensure adequate flood protection at entrances; and
2. Ensure no impact on mainstream flood levels due to the proposed works.

5. Flood Assessment Methodology

The following work scope has been executed:

- Undertake a site visit;
- Build a DRAINS hydrologic model to derive flows for the 5% AEP, 1% AEP, 0.5% AEP and PMF using the methodologies as outlined in the ARR2019;
- Build a TUFLOW hydraulic model to derive water levels, depths, velocities, and hazard for the 5% AEP, 1% AEP, 0.5% AEP and PMF of existing conditions;
- Assess the flood conditions and risks of 'Existing Conditions' and 'Proposed Conditions' and review model results;
- Model the proposed plan and assess the flood impacts;
- Review pertinent planning documentation for applicable flooding controls;
- Develop flood maps which present and proposed flood depth, level, hazard and flood function for the full range of events. Flood level and hazard impacts for all events are also presented;
- Flood risk assessment, reviewing the presented information, considering climate change and addressing any residual risk items. A recommended approach for emergency management is also presented.
- Undertake internal peer review.

Hydrologic Modelling

A hydrologic model was developed using DRAINS to convert rainfall into runoff for input into the hydraulic model using the methodologies outlined in the Australian Rainfall and Runoff guide for flood estimation (ARR2019). This process involves an analysis of the 124 hectare catchment surrounding the site. The following information was used in this model:

- Digital Elevation Model (DEM) based on LiDAR sourced from ELVIS, used to delineate the sub-catchments.
- Percentage impervious for each catchment based on aerial imagery;
- Bureau of Meteorology 2016 rainfall intensities;
- Flow path length and slope for each catchment based on DEMs;
- ILSAX model in DRAINS has been used with soil type 3;
- A retardance coefficient of 0.015 for impervious area and 0.04 for the remaining area.

For the PMF event, the same DRAINS hydrological model was used but the rainfall data and temporal pattern are derived as per the GSDM method and assuming an initial loss of 1 mm and 0 mm/hour of Continuing Losses.

The DRAINS model was run for a range of durations from 20 minutes to 180 minutes for the 5% AEP and 1% AEP events, and from 20min to 60min for 0.5% AEP, and from 15 minutes to 180 minutes for the PMF event. Critical duration and critical storm assessment are performed in the hydraulic model and is further detailed in the section below.

TUFLOW (Hydraulic) Modelling

TUFLOW is a 2D numerical hydraulic modelling package. This software is widely used and is considered best practice under the NSW Floodplain Risk Management Program. It is used to convert applied flows from the hydrology model to derive flood depths, levels, and velocities.

The 'Existing Conditions' TUFLOW hydraulic model is comprised of the following elements:

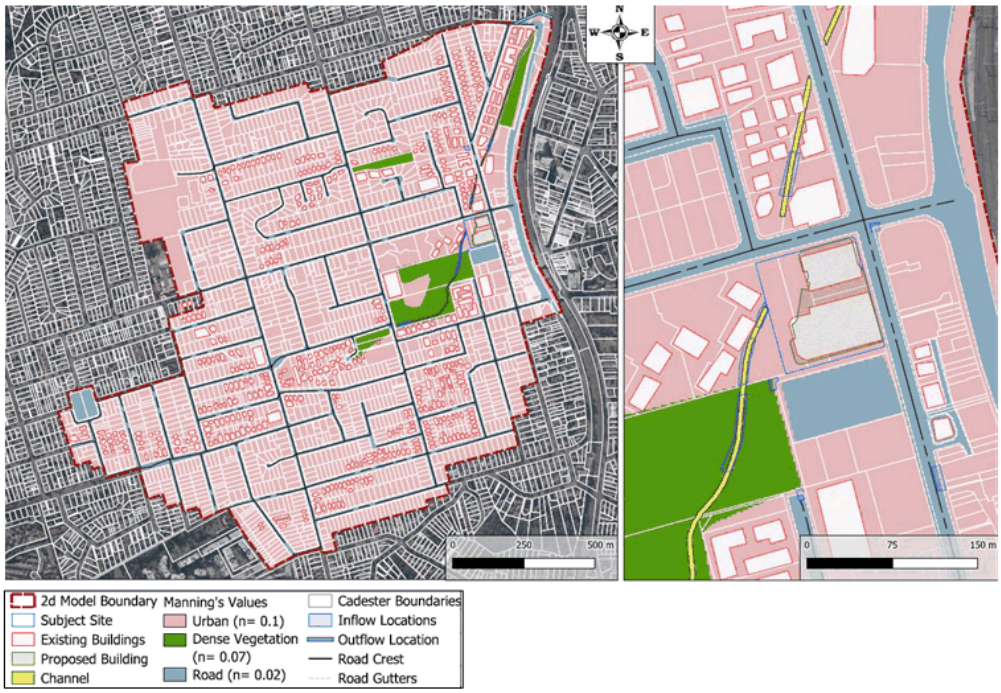
- LiDAR data has been used to generate a 2 m model grid. This data has a typical accuracy of ±0.15 m (1st confidence interval);
- The kerb/gutter and road crests are hydraulic features that have a significant impact on flood behaviour. As such these features have been represented in the model as break lines with invert heights determined by analysis of the LiDAR;
- Buildings can block flood paths and therefore significantly impact flood behaviour. As such, buildings in the vicinity of the subject site were blocked out in the TUFLOW model;
- Manning's 'n' roughness values were applied as follows:
    - Roads - 0.02;
    - Dense Vegetation Area - 0.07;
    - Concrete channel - 0.02;
    - General Residential Area – 0.10 as used in Parramatta River - Ryde Sub-catchments Flood Study and Floodplain Risk Management Plan (SKM, 2013);
- Outside of the channel, stormwater pits and pipes have not been included in the hydraulic model. This is based on a conservative assumption that stormwater pipes are 100% blocked during a flood event. The culverts in the channel use the ARR2019 blockage assessment values in the section below.
- The channel has been modelled as 1D elements. Channel inverts and dimensions were based on Sydney Water dataset, provided survey, site visit and LiDAR elevation data.
- A fixed tailwater was adopted at the catchment's downstream boundary.

A map of the model layout is presented in Image 2 below.

Critical duration and critical storm assessment were undertaken in TUFLOW for the location of the subject site using ARR2019 methods. The critical storm was selected based on a two step process. The temporal pattern producing the median flood level of its respective storm duration was chosen in the first step. All median flood levels are then compared with the critical duration selected from those temporal patterns as the duration producing the highest flood level in the second step. As the PMF does not use ARR2019 temporal patterns, the critical duration was selected based on the duration producing the highest flood level.

The assessment has resulted in a critical duration of 30 minute and critical storm #04 for the 5% AEP event, critical duration of 25 minute and critical storm #03 for the 1% AEP and 0.5% AEP events and critical duration of 15 minute for PMF event.

Image 2 – TUFLOW Model Layout (Existing Conditions) with full model area (Left) and the site (right)



Model Calibration

Unit Flow Rate Comparison

Comparison of study area unit flow rates estimates (also known as the specific yield) for the 1% AEP event have been undertaken as a means of verification of the design flow estimate. The unit flow rate refers to the peak flow generated per unit area and has units of m^3/s per hectare. Across the Sydney Metropolitan area, typical unit flow rates range between 0.3 to 0.6 m3/s per hectare for the 1% AEP event (ARR 1987), depending on the individual catchment characteristics.

Three locations were selected, and the average unit flow rate was calculated as 0.31 m^3/s per hectare. It was found that the calculated unit flow rates align with the calculated flow rates in similar Sydney Metropolitan areas and the specific catchment characteristics. As such, the flood modelling system is producing robust design flow estimates.

Blockage Assessment

The culvert at Carlingford Road is immediately downstream and adjacent to the site. This culvert passes flow downstream under Carlingford Road and is approximately 2.6 (wide) m by 2.3 (high) m. Blockage of this structure can influence the design flood levels on the subject site that are relevant to basement entry levels (entrances LG1 and LG2, see Image 3).

As such, and in line with best practice, GRC have carried out a blockage assessment for this structure in accordance with ARR2019. The blockage assessment is appended to this report as Appendix A. A summary table of results of the blockage analysis is provided below.

Table 1: Summary of Blockage Assessment Results

Event AEP	B_{DES} (%)	B_{DES} (%)	B_{DES} (%)

	Floating	Non-Floating	Final
AEP > 5% (frequent)	*0%*	*0%*	*0%*
AEP 5% - AEP 0.5%	*10%*	*15%*	*15%*
AEP < 0.5%	*20%*	*25%*	*25%*

As can be seen from Table 1 above the applicable blockage rate for the 5% AEP, 1% AEP and 0.5% AEP events is 15%. For the PMF the 25% blockage value is used. These blockage values were adopted for the TUFLOW model in all scenarios.

Existing Conditions Results

The Existing Conditions TUFLOW model was run for the critical durations. Results are presented in Figure Set A with the following figures:

Depths and Levels Maps with Tabulated Results at Key Locations

- A01: 5% AEP 15% Blockage - Peak Depths and Levels (Existing)
- A02: 1% AEP 15% Blockage - Peak Depths and Levels (Existing)
- A03: 0.5% AEP 15% Blockage - Peak Depths and Levels (Existing)
- A04: PMF 25% Blockage - Peak Depths and Levels (Existing)

Velocity Map

- A05: 1% AEP 15% Blockage - Peak Velocities (Existing)

Hazard Maps

- A06: 5% AEP 15% Blockage - Peak Flood Hazard (Existing)
- A07: 1% AEP 15% Blockage - Peak Flood Hazard (Existing)
- A08: 0.5% AEP 15% Blockage - Peak Flood Hazard (Existing)
- A09: PMF 25% Blockage - Peak Flood Hazard (Existing)

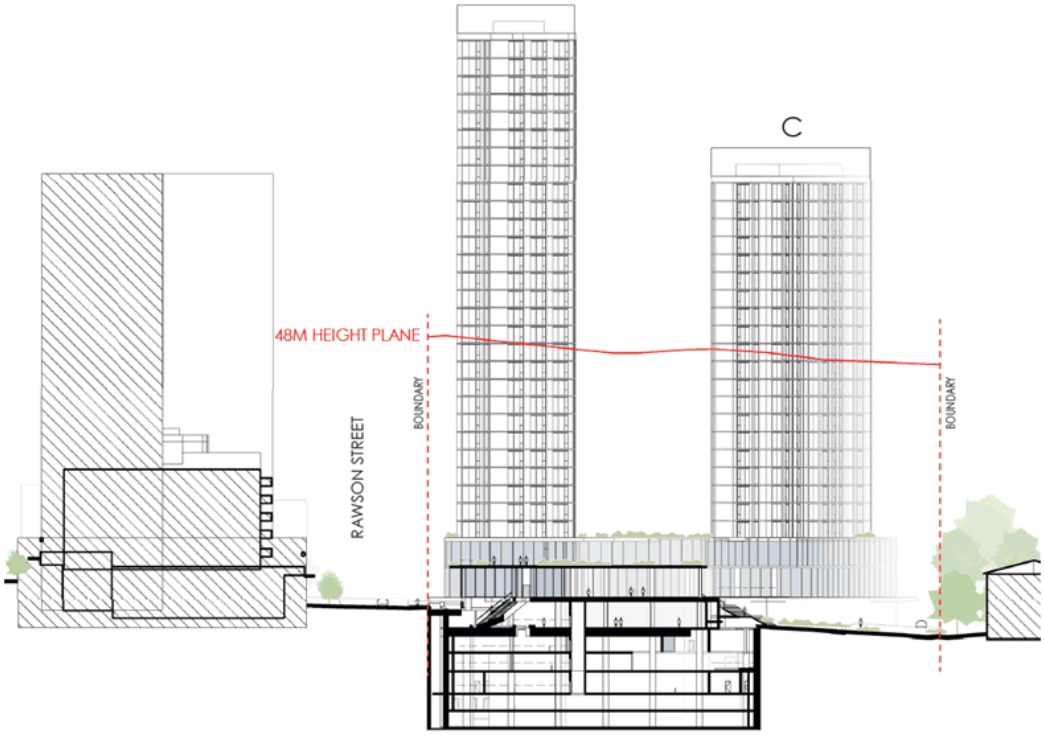
Flood Function Maps

- A10: 5% AEP 15% Blockage - Hydraulic Flood Function (Existing)
- A11: 1% AEP 15% Blockage - Hydraulic Flood Function (Existing)
- A12: 0.5% AEP 15% Blockage - Hydraulic Flood Function (Existing)
- A13: PMF 25% Blockage - Hydraulic Flood Function (Existing)

6. The Proposed Development

A mixed-use development is proposed for the site and the proposed design has been articulated in detail in an Epping Town Centre drawing set prepared by Oakstand (12/05/23). The proposed footprint and sectional elevation is documented in Images 3 and 4 below.

Image 3: Proposed Development – North Elevation (looking in a southerly direction from Carlingford Road)

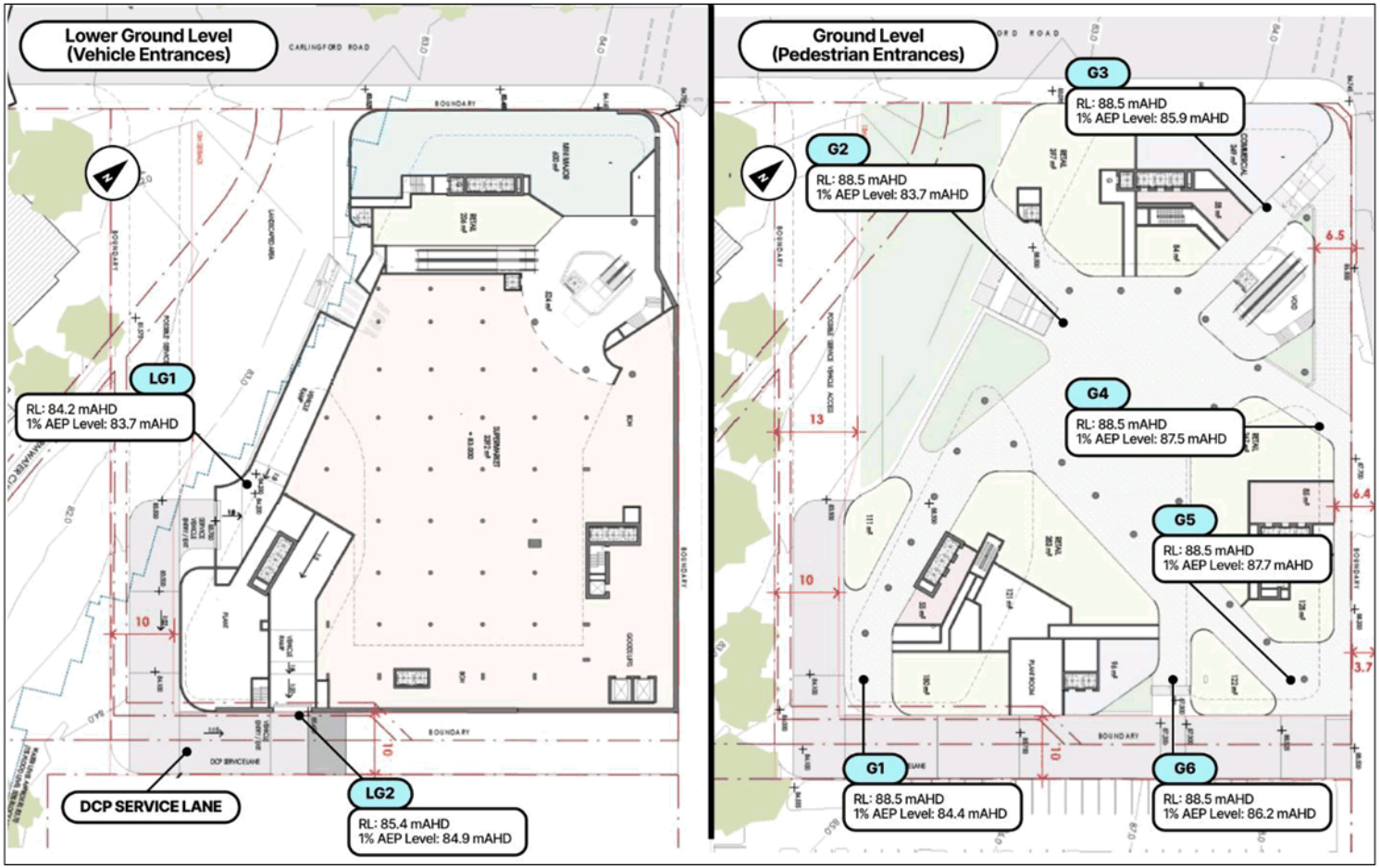


The most relevant features of the proposed works in relation to flooding are as follows:

- Basement Level 3 B3 – this basement is the lowest floor proposed and is at a level of 72.9 mAHD. Access is via Basement 2. 134 car spaces are proposed at B3.
- Basement Level 2 B2 – floor level is 75.9 mAHD and access is via Basement 1. 88 Car spaces and loading dock for supermarket and other facilities.
- Basement Level 1 B1 – floor level is 78.9 mAHD and access is via Lower Ground floor. 70 car spaces are proposed.
- Lower Ground LG – Access is via DCP Service Lane with entrances at west (84.2 mAHD) and at south (85.4 mAHD).
- Ground Floor G – Access is via lower floors or from Rawson Street or DCP Service Lane. Ground Floor level is 88.5 mAHD and the DCP Service Lane entrance is at 87.2 mAHD and the Rawson Street entry is from 86.5 mAHD.

Above these levels is residential development with multiple floors.

Image 4: Proposed Development – Entrance Locations and Relevant Flood Levels (Ground and Lower Ground Floors)



Proposed Development Finished Floor Level (FFL) Requirements

The finished floor levels for the proposed development are documented in Table 2 and Image 4. Flood Planning Level is from the City of Parramatta Council DCP 2023, using planning matrix in Table 5.1.1.2 of 'Part 5: Environmental Management' of the DCP. This requirement sets the floor level to the 1% AEP flood level plus 0.5m freeboard, and below ground car parking areas to have passive protection upto the 1% AEP flood level plus 0.5m freeboard and must be protected from the ingress of floodwater to the PMF level. Basement protection can utilise self-powered flood gates to protect to the PMF level. A full list of the proposed developments compliance is in Section 9.

Table 2 - Proposed Development Finished Floor Level (FFL) Requirements

Entrance Location	1% AEP Level (mAHD)	PMF Level (mAHD)	Flood Planning Level (mAHD)	Proposed Level (mAHD)	Comments
LG1 Basement Carpark Entry	83.7	85.3	84.2	84.2 (Flood gate at 85.3)	Passive flood protection is provided by the entry road having an invert of 84.2 mAHD. PMF protection is provided via a proposed gate to 85.3 mAHD.
LG2 Basement Carpark Entry	84.9	85.6	85.4	85.4 (Flood gate at 85.6)	Passive flood protection is provided by the entry road having an invert of 85.4 mAHD. PMF protection is provided via a proposed gate to 85.6 mAHD.
G1 Commercial	84.4	Not applicable to FPL	84.9	88.5	Proposed floor level is 3.6m above FPL
G2 Commercial	83.7	Not applicable to FPL	84.2	88.5	Proposed floor level is 4.8m above FPL
G3 Commercial	85.9	Not applicable to FPL	86.4	88.5	Proposed floor level is 2.1m above FPL
G4 Commercial	87.5	Not applicable to FPL	88.0	88.5	Proposed floor level is 0.5m above FPL
G5 Commercial	87.7	Not applicable to FPL	88.2	88.5	Proposed floor level is 0.3m above FPL
G6 Commercial	86.2	Not applicable to FPL	86.7	88.5	Proposed floor level is 1.8m above FPL

7. Post-Development Flood Affectation

The 'Existing Conditions' model was updated to the 'Post Development Conditions' model by replacing the existing building extents on the site with the new development extent as null cells (hydraulic model cells which are unable to store or convey flow). The extent of the works that impact the ground surface are shown in all figures below.

All other parameters were maintained from the Existing Conditions TUFLOW model. Post Development Conditions were then produced for the same critical duration events as used for Existing Conditions.

Results

The Proposed Conditions results are presented in Figure Set B with the following figures:

Depths and Levels Maps with Tabulated Results at Key Locations

- B01: 5% AEP 15% Blockage - Peak Depths and Levels (Post Development)
- B02: 1% AEP 15% Blockage - Peak Depths and Levels (Post Development)
- B03: 0.5% AEP 15% Blockage - Peak Depths and Levels (Post Development)
- B04: PMF 25% Blockage - Peak Depths and Levels (Post Development)

Velocity Map

- B05: 1% AEP 15% Blockage - Peak Velocities (Post Development)

Hazard Maps

- B06: 5% AEP 15% Blockage - Peak Flood Hazard (Post Development)
- B07: 1% AEP 15% Blockage - Peak Flood Hazard (Post Development)
- B08: 0.5% AEP 15% Blockage - Peak Flood Hazard (Post Development)
- B09: PMF 25% Blockage - Peak Flood Hazard (Post Development)

Flood Function Maps

- B10: 5% AEP 15% Blockage - Hydraulic Flood Function (Post Development)
- B11: 1% AEP 15% Blockage - Hydraulic Flood Function (Post Development)
- B12: 0.5% AEP 15% Blockage - Hydraulic Flood Function (Post Development)
- B13: PMF 25% Blockage - Hydraulic Flood Function (Post Development)

Impacts

Impacts have been produced by comparing Post Development Conditions results against Existing Conditions. These are presented in Figure Set C for both level impacts and hazard impacts:

Impacts on Water Levels, including a Water Level Profile along the channel

- C01: 5% AEP 15% Blockage - Development Water Levels Impact
- C02: 1% AEP 15% Blockage - Development Water Levels Impact
- C03: 0.5% AEP 15% Blockage - Development Water Levels Impact
- C04: PMF 25% Blockage - Development Water Levels Impact

Impacts on Hazard Categories.

- C05: 5% AEP 15% Blockage - Development Hazard Impact
- C06: 1% AEP 15% Blockage - Development Hazard Impact

- C07: 0.5% AEP 15% Blockage - Development Hazard Impact
- C08: PMF 25% Blockage - Development Hazard Impact

A key component of the proposed works has been to keep any proposed development outside of areas of significant flow in the 1% AEP event, and as such we can see in the attached figures that there are no offsite impacts to private property resulting from the proposed works in events from the 5% AEP up to and including the 0.5% AEP.

In addition to the water level impacts, the hazard impacts have been mapped for all events. These indicate whether there has been a change in the hazard category due to the development, which is an indication of whether the development can cause changes to flood behaviour and risk. For the 5% AEP up to and including the 0.5% AEP, there are no large areas with expected change in hazard and all possible impacts to hazards are affecting very small areas and as such isn't expected to change flood behaviour or risk. This is discussed further in the risk assessment in Section 8.

Minor water level impacts < 0.02m are shown in the PMF, the worst possible flood that can occur at this location with an estimated AEP of between a 0.0001% AEP to 0.00001%. These are classed as minor due to the rarity of this event and the minimal impact this level change has on the flood behaviour at the site for this event. In addition, the PMF hazard impacts indicate some localized increases in hazard category in Rawson St. However, that section of Rawson St is already unsuitable for evacuation before the development and as such the impacts aren't expected to change the evacuation strategy of the site or community. The relevance of these impacts are further discussed in the risk assessment in Section 8.

8. Risk Assessment

Sections 4 and 5 have defined the Existing Conditions for the site and local catchment. Sections 6 and 7 have provided the Proposed Conditions for the site, and the potential impacts due to the development for a wide range of flood events (5% AEP to PMF). Together, these provide sufficient information to discuss the potential risks associated with flooding at the site in the context of:

- Risks to the community. In particular the impacts the development has on the existing population, existing property and infrastructure.
- Risks to the development and its users. The risks discussed are concerning the safety of the people using and residing at the site and any risks associated to the property and it surrounds due to floodwater.

In addition to the above a Climate Change assessment discussing the potential impacts of climate change on the proposed development is presented below.

Risks to the Community

Risks to the community are largely addressed through compliance with the local Council planning documents and requirements. The City of Parramatta Council's DCP and LEP are quite recent, reflecting updated advice on the management of floodwater within their community.

The development is shown to be fully compliant with the:

- The Parramatta Development Control Plan (DCP 2023);
- The Parramatta Local Environmental Plan (LEP 2023);
- Ministerial Directions 4.1;

Details addressing each of the above plans is covered in Section 9.

The above planning documents largely focus on the 1% AEP and PMF, the remainder of this section discusses any residual risk in events over the full range of events (5% AEP to PMF). Table 3 provides a summary.

Table 3: Summary of risk factors due to flood behaviour.

Impact	No Change (range of floods)	Potential Change (range of floods)	Risk Assessment Summary	Relevant References
Flood Levels	*5% AEP to 0.5% AEP*	*PMF*	*Very low risk. Discussed in PMF section below.*	*Impacts: Section 7. Figures: C01 to C04*
Duration of Inundation	*5% AEP to PMF*	*None*	*No risk*	*Discussed below under Risks to the Development: Evacuation*

Flood Extent	*5% AEP to PMF*	*None*	*No risk*	*Covered in flood level figures (see above)*
Warning and Evacuation Time	*5% AEP to PMF*	*None*	*No risk*	*Discussed below under Risks to the Development: Evacuation*
Flood Function	*5% AEP to PMF*	*None*	*No risk*	*Figures: A10 to A13 for Existing Conditions and B10 to B13 for Post Development Conditions*
Hazard	*5% AEP to 0.5% AEP*	*PMF*	*Very low to no risk. Discussed in PMF section below.*	*Impacts: Section 7 Figures: C05 to C08*

As shown in Table 3, all events are showing no impacts except some minor impacts in the PMF. These are discussed further below.

PMF Results

The Probable Maximum Flood (PMF) is the largest flood that could conceivably be expected to occur at a particular location. The estimated AEP for such an event is between a 0.0001% AEP to 0.00001% AEP. In terms of risk, the Flood Risk Management Manual (DPE 2023) provide a useful table, reproduced below as Table 4. This shows the risk associated with events upto the 0.01% AEP, with the chance of experiencing one 0.1% AEP flood in an 80-year period as 0.8%. We can infer from this that the chance of a PMF occurring over an 80 year period is much less than 0.8%.

Table 4: Chance of encountering a given sized flood one or more times in 80 years. (Reproduced from Table 1 of the Flood Risk Management Manual DPE 2023)

Annual exceedance probability %	Average recurrence interval (1 in x years)	Chance of experiencing in an 80-year period	
		at least once %	at least twice %
20	5	100	100
10	10	99.9	99.8
5	20	98.4	91.4
2	50	80.1	47.7
1	100	55.3	19.08
0.5	200	33	6.11
0.2	500	14.8	1.14
0.1	1,000	7.69	0.3
0.01	10,000	0.8	0.003

Given the rarity of the PMF, it is mostly used as a measure of the maximum extent of flood prone land, with applications in evacuation planning for flooding. In Sections 6 and 9, the DCP requires basement parking to have a level of protection up to the PMF, which the proposed development is shown to provide.

The impacts to levels are very minor, with most of the expected change to be <0.02m over an extent within the mainstream flooding occurring in the channel during a PMF, as well as a localised <0.03m increase in the overland flood water in Rawson Street. Neither of these increases impact on any critical or sensitive use facilities and no new buildings are impacted by flooding in the PMF, as the flood extent is very similar.

In addition to the above, the proposed development has no impacts on Hazards within the mainstream flooding occurring within the channel. There are some increases in the hazard categories within Rawson St towards the junction of Carlingford Rd, but as this section of Rawson St is already classed as H5 under Existing Conditions and unsuitable for all vehicles, the proposed development isn't impacting on the evacuation potential through Rawson St. These hazards changes are fully contained within the road extent, and as such do not pose additional risk to any buildings.

Due to the combined factor of:

- The rarity of the PMF;
- The impacts due to levels are very minor; and,
- The impacts on hazard categories are very minor.

It was assessed that the change in flooding impacts during a PMF pose a very low risk to the community.

Risks to the Development and Users

Risks to the development and its proposed users is again mostly addressed through compliance with the local Council planning documents and requirements. In particular, the proposed development has shown:

- The basement has a passive level of protection to the 1% AEP + 500mm freeboard through the raised entrance crest. (see Section 6)
- The basement has a level of protection to the PMF provided through the proposed flood gates. (see Section 6)
- The first level with pedestrian access to outside of the site is Ground Floor G which is above the 1% AEP + 500mm freeboard (see Section 6) with all entrances shown to also be above the PMF flood level.
- All floors above Ground Floor G are residential and protected to well above the PMF flood level.

Given the above design aspects, the building and its occupants are expected to be protected against the ingress of floodwater for all events. The residual risks to address are for the emergency response strategy, including discussion on access to the site in the event of a flood.

Evacuation

The expected warning time is expected to be less than 30 minutes from the onset of the precipitating weather event to peak water levels at the site. As such, site is impacted by flooding classed as 'flash flooding', that is flooding that occurs "... within 6 hours of the precipitating weather event, and often involves rapid water level changes and flood water velocity. This definition excludes flooding caused

by dam failure, storm surge or tsunami although similar emergency management principles may apply to these events"' (AFAC 2018) and extracted from EM01 (DPE 2023).

The expected duration of inundation is also to be relatively short for all events up to and including the PMF, with water levels around the site expected to drop to trafficable conditions within an hour after the precipitation event subsides.

Given the above flood information, the safest approach to protect people during a flood would be for all people located on the site to shelter onsite until the precipitation event finishes and waters subside, and only leaving after confirming with local emergency combat authorities such as the SES. The building itself has been shown to be protected from the ingress of floodwater for all events.

GRC Hydro do not recommend ever driving through floodwater. An assessment of the flood modelling shows that for all events up to and including the 0.5% AEP event both the DCP service lane and Rawson St are subject to flooding hazard class H1 (generally safe for people, vehicles and buildings). The safest evacuation route it to travel south on Rawson St onto Blaxland Rd or Epping Rd. The junction of Rawson St, Carlingford Rd and Ray Rd is unsafe to vehicles during most events. This flood report cannot comment on the safety of roads during a flood beyond the catchment extent. All roads near the site can be unsafe for vehicles during a PMF event, but due to the flash flooding nature of the catchment these hazards persist for less than an hour.

Based on the available flood information this report can conclude:

- The proposed building is safe from the ingress of floodwater for all events.
- As the site has a very short warning time, and a short duration of inundation, the recommended emergency management approach in the event of a flood is to adopt a shelter-in-place strategy.

Given the above, flooding poses a low risk to both the building and its users, with residual risks manageable through proper emergency management planning. The above also demonstrates the proposed building is able to undertake an appropriate emergency flood management response with residual risks associated with a shelter in place strategy minimised through the short duration of inundation times expected.

Risks due to Climate Change

To assess the risk due to climate change, the Existing Conditions and Proposed Conditions TUFLOW models were run with a climate change event, and the impacts assessed. Results are presented in Figure Set D for:

- D01: 1% AEP for RCP8.5 2090 Climate Change - Peak Depths and Levels (Existing)
- D02: 1% AEP for RCP8.5 2090 Climate Change - Peak Depths and Levels (Post Development)
- D03: 1% AEP for RCP8.5 2090 Climate Change - Development Water Levels Impact

The climate change event used was for the RCP 8.5 scenario in 2090, using the ARR2019 recommended rainfall depth multiplier of a 19.8% increase relative to current climate conditions. This is quite a conservative approach as the RCP8.5 is the worst of the current climate change pathways used in flood modelling. An assessment of the effects of sea level rise were considered unnecessary as the site lies well beyond the influences of coastal sea level.

The impacts are comparing the Existing Conditions with Climate Change against the Proposed Conditions with Climate Change, which is a measure of the potential future impact the site could

cause. As shown in figure D03, the proposed development is unlikely to pose a risk to the community in the future with impacts being minor and largely contained onsite.

In addition to the impact assessment, the water levels shown in Figure D02 show that flood levels in the 1% AEP under climate change conditions are unlikely to rise to beyond the current 1% AEP + 500mm freeboard levels. As the building is passively protected to this level, we can also conclude that the site is unlikely to become at risk during the 1% AEP under future climate change conditions.

As the proposed site has been shown to be:

- Unlikely to increase offsite water levels in the future; and,
- Unlikely to have water levels in the future 1% AEP event with climate change higher that the current 1% AEP event + 500mm freeboard.

The proposed development is unlikely to pose either a risk to the community, or be under risk, because of climate change.

9. Development's Suitability Relative to Relevant Planning Requirements

GRC has assessed the proposed development relative to the site's flood affectation with regard to the following relevant planning instruments:

- Parramatta Local Environmental Plan (LEP) (2023) – Section 5.21 - Flooding.
- Parramatta Development Control Plan (DCP) (2011), specifically Table 2.4.2.1.2; and
- Ministerial Directions – 4.1 – Flooding

The flood-related components of these planning instruments are quoted below with GRC responses regarding the compliance of the proposed development included in-line below in blue.

Parramatta Development Control Plan (DCP) (2023)

Flood planning controls for development at the site are set out in Section 5.1.1 of the Parramatta DCP. This report addresses the Flood Risk Management controls.

The 'Controls' C.01 to C.24 have been addressed below with references to specific report sections where possible. The 'Objectives' have been reviewed but found to be addressed through meeting the Controls and no addition comments have been provided regarding them.

The Matrix Development Controls for a Medium Flood Risk Area for the residential and commercial land use types have been addressed after C.24.

Control	GRC Response
C.01: Development is to be compatible with any relevant Floodplain Risk Management Plan and consistent with the current NSW Floodplain Development Manual, unless otherwise accepted by Council.	This report has been prepared with regards to the Flood Risk Management Manual (DPE 2023) and covers the full scope of the Flood Impact and Risk Assessment LU01 guidelines (DPE 2023). The site is outside of any known Floodplain Risk Management Plan.
C.02: Any increased risk to life from development must be mitigated to Council's satisfaction.	Section 8 discusses the management of risks to the community, users, property and infrastructure due to the development. Most risk to life is mitigated through a design showing a level of protection up to the PMF.
C.03: The Flood Planning Level under normal circumstances shall be the higher of the 1% AEP riverine flood level or the 1% AEP overland flow flood level, as accepted by Council, plus a minimum 500mm freeboard safety factor. Council may require additional freeboard to manage risk in exceptional circumstances.	Section 6 details the compliance with a 1% AEP + 500mm freeboard, as well as protection up to the PMF for basement carparking.
C.04: Significant filling or excavation of land below the Flood Planning Level is generally not permitted. If required by Council, development proposals must demonstrate, through detailed hydraulic modelling, that any proposed filling or excavation of land above the Flood Planning Level up to the Probable Maximum Flood (PMF) will not adversely impact flood behaviour.	Section 6 details the proposed design, with a design that minimises any development within the 1% AEP extent. This approach has ensured that in the results presented in Section 7 that the development would not adversely impact flood behaviour.

C.05: Council may require proposals for raising structures to provide a report from a suitably qualified structural engineer demonstrating that the raised structure will not be at risk of failure from the forces of floodwaters.	NA - Outside of the scope of this flood assessment.
C.06: Fencing, landscaping and public domain works are to be constructed in a manner that does not significantly affect the flow of floods.	Landscaping and building works are shown to not affect the flow of floodwater. Fencing outside of the building extent can be addressed once finalised.
C.07: New development is only permitted where reliable access is available for the evacuation of an area potentially affected by floods to an area free of risk from flooding. Evacuation should be consistent with any relevant flood evacuation strategy.	Shelter in place is the best available strategy given the lack of warning (lack of warning pertains to the relatively small catchment which means short time to rise). That said, relatively safe egress to Rawson Street is available in all events. GRC do not recommend anyone should drive during a rare flood event and the site is well placed to shelter people in place until such time as the event has passed (will be sub one hour based on duration of inundation results). Evacuation potential is discussed in Section 8.
C.08: Council requires an applicant to make a Flood Enquiry Application where this information is available. The information supplied to an applicant via a Flood Enquiry Application will inform the applicants DA flood model where deemed necessary.	NA - Outside of the scope of this flood assessment.
C.09: Where hydraulic flood modelling is required, flow hazard categories H1 to H6 as set out in Figure 5.1.1.1 must be identified and adequately addressed in the design of the development. Where available, Council will issue flood and hazard levels to be adopted in any hydraulic flood modelling, unless an alternative approach is agreed with Council. Flood modelling will need to account for any projected changes to flood levels or behaviour as a result of climate change over the design life of the development.	Hazard mapping is consistent with the H1 to H6 approach of classifying floodwater, and uses the AIDR hazard curves. See figures A06-A09 and B06-B09 for the mapped hazard results. Climate change is addressed in Section 8 and figures D01-D03. These show no expected future impacts due to the development and that the future climate change levels remain below the current 1% AEP + 500m freeboard levels.

C.10: Council may require an additional overland flow study to support an application on sites where such flooding is expected to be dominant over flooding from waterways (riverine flooding). Increases in local rainfall intensity and other rainfall and flood behaviour resulting from climate change should be factored into any overland flow modelling undertaken.	The flood modelling presented includes both mainstream and overland flooding. These demonstrate flood levels in Rawson St and along the basement access route remain below the FPL and basement entrance levels as shown in Section 6.
C.11: Development with high sensitivity to flood risk (e.g. critical public utilities) must be sited and designed to provide reliable access and an acceptably minimal risk from flooding.	NA – development is not a critical or sensitive land use type.
C.12: Design responses as part of flood mitigation measures associated with new and existing developments should not result in significant impacts upon the amenity of an area by way of unacceptable overshadowing of adjoining properties, privacy impacts (e.g. unsympathetic house raising) or by being incompatible with the streetscape or character of the locality (including heritage).	NA - No proposed flood mitigation measures as part of this development.
C.13: Development must be planned and designed to respond to both riverine (mainstream) flooding and overland flow flooding.	The flood modelling presented includes both mainstream and overland flooding. These demonstrate flood levels in Rawson St and along the basement access route remain below the FPL and basement entrance levels as shown in Section 6.
C.14: Development must not divert flood waters, nor interfere with floodwater storage, nor the natural function of waterways.	Development has been proposed outside of the 1% AEP extent, which removes the interference with the natural function of the waterways. Impacts in Section 7 show this approach has no impacts on the waterway.
C.15: In general, Council will not support proposals for flood flow-through or flood storage chambers within or beneath a new building, and alternate design solutions will be required.	NA – no flood flow-through or flood storage chambers proposed for this development.
C.16: Sensitive Uses and Facilities' and 'Critical Uses and Facilities,' as defined in Table 5.1.1.1, in general, not permitted on land subject to flooding in a PMF event.	NA – development is not a critical or sensitive land use type.

C.17: The following 'Sensitive Uses and facilities' being centre-based child care and aged care facilities that occupy land subject to flooding in a PMF event, may be considered provided Council can be satisfied that: …	NA – development is not a critical or sensitive land use type.
C.18: Unless otherwise advised by Council, all development in the floodplain involving the construction of a new building or significant alterations to an existing building, and or intensification of a use must be supported by flood hazard modelling that is: a) based on the 'General Flood Hazard Vulnerability Curves' in Figure 5.1.1.1 [AIDR 2017 Hazard values] for the 1% AEP flood and the PMF. b) is assessed in terms of the following [H1 to H6] hazard categories and risks of harm:	Hazard mapping is consistent with the H1 to H6 approach of classifying floodwater and uses the AIDR hazard curves. See figures A06-A09 and B06-B09 for the mapped hazard results. Section 8 presents a risk assessment which uses the H1 to H6 to quantify risks of harm.

C.19: Unless otherwise advised by Council, all development in the floodplain involving the construction of a new building or significant alterations to an existing building, and or intensification of a use is to be supported by a merit-based flood hazard and flood impact risk assessment that:
a) Presents evidence-based analysis of the hazard, risk and harm to occupants and those in the surrounds and demonstrates how harmful factors will be mitigated.
b) Includes information on the following aspects as necessary, to enable Council to assess risk and potential for harm:
• 1% AEP and 5% AEP flood levels, flood extents, flow rates, depths and velocities for mainstream and overland flow floods;
• PMF levels, hazard, extent and behaviour for mainstream floods (not overland flow floods);
• modelled hydraulic hazard levels, (H1-H6), extent and behaviour for 1% AEP mainstream and overland flow floods;
• warning times and duration of flooding;
• available warning systems (if any);
• characteristics and vulnerabilities of future occupants; likelihood of multiple storms – and multiple flood peaks;
• 'horizontal' evacuation pathways including accessibility considerations;
• 'vertical' evacuation opportunities and shelter in place facilities above the PMF where permitted;
• emergency services access availability;
• local terrain;
• the development in context; and
• the proposed use and occupation of the development.

a) Section 8 presents a risk assessment supported by flood result evidence to support the analysis of potential hazard, risk and harm to occupants and the surrounding community.

b)

- Results are presented for Existing Conditions in Section 5 and figure set A
- Results are presented for Proposed Conditions in Section 7 and figure set B
- Impacts due to the development are presented in Section 7 and figure set C
- Warning time, and duration of inundation are presented as part of the risk assessment in Section 8
- A recommended evacuation strategy demonstrating that vertical evacuation opportunity is available and able to provide protection for all events including the PMF. Section 7 provides floor levels and the evacuation potential is discussed in Section 8.
- Evacuation from the site is available, but not recommended. Discussed further in Section 8.
- Proposed use and occupation is in Section 6.
- Context and terrain is presented over Sections 1 to 6.
- All of the above considers the a wide range of flood events from the 5% AEP to the PMF.
- Mapped results include flood depths, levels, velocities, hazards and flood function.

C.20: Basement car parks on properties within the floodplain are strongly discouraged and alternate design options should be discussed with Council at the pre-lodgement stage. Where a basement car park on a property within the floodplain is proposed, it must be demonstrated that the proposed basement car park has been protected from all flooding up to and including the PMF event. An adequate flood emergency and risk management plan must also be provided where basement car parks are proposed in the floodplain, please see Flood Warning and Emergency Response Planning section below for requirements.	The proposed basement car park has been shown to provide passive protection upto the 1% AEP + 500mm freeboard and protection upto the PMF in Section 6 through the use of automatic floodgates..
C.21: Where Council allows basement car parking in flood prone land the proposal must demonstrate: a) effective floodproofing and flood exclusion of the basement against all floods up to the PMF; b) adequate safety for occupants of the basement and building including a flood free evacuation path (stairway or other suitable method) from the basement levels to a safe refuge above the PMF; c) adequate safety for occupants at ground and ground floor levels of the building including a flood free evacuation path (stairway or other suitable method) from the ground floor levels to a safe refuge above the PMF; and d) consistency with other Council objectives (such as traffic management).	The proposed basement car park has been shown to provide passive protection upto the 1% AEP + 500mm freeboard and protection upto the PMF in Section 6 through the use of automatic floodgates. The basement carpark has vertical access to higher levels within the building, along a flood free evacuation path.

C.22: Demonstrate the appropriateness of a basement car park within a flood prone area, the following details must be included as a minimum in the Development Application: a) Demonstration that high hazard floodwaters (H3 or greater) will not occur in a 1% AEP event in the area adjacent to the driveway. b) The basement must be protected from the ingress of floodwater by passive measures at least up to the flood planning level. These measures are likely to include provision of a driveway crest at or above the flood planning level with associated wing/or bund walls to this level to prevent floodwaters flowing into the basement. c) The basement must be protected from the ingress of floodwater via the driveway up to the Probable Maximum Flood level. These measures are likely to include provision of a self- triggering and self-powered flood gate at or near the driveway crest that reaches the level of the PMF, together with corresponding wing wall bunds etc. to the same PMF level. d) The basement must be protected from the ingress of floodwater via stairwells and other openings up to the Probable Maximum Flood level. These measures are likely to include a combination of a self-closing flood doors, flood gates and bund walls. Flood doors may also be fire doors. e) Provision of flood-free escape stairs from the basement up to a place of refuge within the building above the PMF level with adequate facilities for users during and after a flood. f) Provision of adequate car parking for the disabled and an escape path that can be followed to safety. g) Submission of a comprehensive Flood Emergency Response Plan incorporating all of the above.	As shown in figure B07, only H1 hazard is expected at the area adjacent to the driveway in the 1% AEP. The proposed basement car park has been shown to provide passive protection upto the 1% AEP + 500mm freeboard and protection upto the PMF in Section 6 through the use of automatic floodgates.. The basement carpark has vertical access to higher levels within the building, along a flood free evacuation path.

C.23: The Building Management System and Plan for the development with a proposed basement car park within a flood prone area must include all necessary measures to maintain, test and operate the flood protection devices including flood gates, doors and barriers, flood sensors, flood refuges and FERP.	NA - Outside of the scope of this flood assessment.
C.24: Floodplain Development Matrix	See below

Flood Risk Precincts (FRPs)	Planning Consideration	Floor Level	Building Components	Structural Soundness	Flood Affectation	Car Parking & Driveway Access	Evacuation	Management & Design
High Flood Risk	Sensitive Uses & Facilities	X	X	X	X	X	X	X
	Critical Uses & Facilities	X	X	X	X	X	X	X
	Residential*	X	X	X	X	X	X	X
	Commercial & Industrial	X	X	X	X	X	X	X
	Open Space & Non-Urban	1	1	1	1	2, 4, 6, 7	1, 4	2, 3, 4
	Subdivision	X	X	X	X	X	X	X
	Filling	X	X	X	X	X	X	X
	Concessional Development	4	1	1	1	1, 5	3, 4, 6	2, 3, 4
Medium Flood Risk	Sensitive Uses & Facilities	X	X	X	X	X	X	X
	Critical Uses & Facilities	X	X	X	X	X	X	X
	Residential*	2	1	1	1	1, 3, 5, 6, 7	3, 4, 6	2, 3, 4
	Commercial & Industrial	2	1	1	1	1, 3, 5, 6, 7	3, 4, 6	2, 3, 4
	Open Space & Non-Urban	1	1	1	2	2, 4, 6, 7	1, 4	2, 3, 4
	Subdivision				1		3, 4, 5	1
	Filling	X	X	X	X	X	X	X
	Concessional Development	4	1	1	1	1, 5	2, 5	2, 3, 4

Floor Level (2): All habitable floor levels to be equal to or greater than the 1% AEP (100 year ARI) flood level plus 0.5 metre freeboard.	As shown in Section 6, all floor levels are greater than 1% AEP + 500mm freeboard.

Building Components (1): All structures to have flood compatible building components and construction below the 1% AEP (100 year ARI) flood level plus freeboard.	NA - Outside of the scope of this flood assessment.
Structural Soundness (1): Unless otherwise approved by Council, a structural engineer's report is required to certify that the structure can withstand the forces of floodwater, debris and buoyancy up to and including a 1% AEP (100 year ARI) flood level plus freeboard.	NA - Outside of the scope of this flood assessment.
Flood Affectation (1): A hydraulic engineer's report is required to certify that the development will not increase flood affectation elsewhere, having regard to: (i) loss of flood storage; (ii) changes in flood levels, flows and velocities caused by alterations to flood flows; and (iii) the cumulative impact of multiple potential developments in the vicinity.	As shown in Section 7, the development is not changing flood behaviour, function, or has impacts on flood levels, flows and velocities.
Car Parking & Driveway Access (1): The minimum surface level of unenclosed parking spaces or carports shall be as high as practical, but no lower than 0.1 metres below the 1% AEP (100 year ARI) flood level. In the case of garages and other enclosed parking areas for less than 3 motor vehicles, the minimum surface level shall be as high as practical, but no lower than the 1% AEP (100 year ARI) flood level, plus 0.15 metres freeboard.	NA – No unenclosed parking spaces proposed or encloses parking areas for less than 3 motor vehicles.
Car Parking & Driveway Access (3): Garages, and other enclosed car parking areas, capable of accommodating more than 3 motor vehicles, must be protected from inundation by floods equal to or greater than the 1% AEP (100 year ARI) flood. Ramp levels to be no lower than 0.5m above the 100 year ARI flood level. Where below ground car parking is proposed additional measures must achieve protection up to the PMF.	The proposed basement car park has been shown to provide passive protection upto the 1% AEP + 500mm freeboard and protection upto the PMF in Section 6 through the use of automatic floodgates.

Car Parking & Driveway Access (5): Unless otherwise approved by Council and provided this does not obstruct or displace floodwaters, the level of the driveway providing access between the road and parking spaces shall be no lower than 0.2 metres below the 1% AEP (100 year ARI) flood level.	Compliant as depths less than 0.05m shown in the 1% AEP across the driveway access between the road and basement parking entrance. See Figure B02.
Car Parking & Driveway Access (6): Enclosed car parking, and car parking areas accommodating more than 3 motor vehicles, with a floor below the 1% AEP (100 year ARI) flood level, shall have adequate warning systems, signage, exits and evacuation routes. Refer to Flood Warning and emergency Response Planning section for requirements.	Evacuation is discussed in Section 8.
Car Parking & Driveway Access (7): Restraints or vehicle barriers to be provided to prevent floating vehicles leaving a site during a 1% AEP (100 year ARI flood.)	All parking areas protected in all events.
Evacuation (3): Reliable access for pedestrians required from the site to an area of refuge (including shelter in place) above the PMF level, on site (e.g. second storey) or off site.	As discussed in Sections 6 and 8, all levels are protected to the PMF allowing a shelter in place strategy to be adopted.
Evacuation (4): Applicant is to demonstrate the development is consistent with any relevant flood emergency response plan, flood risk management plan or similar plan.	No current flood emergency response plans, or similar, are currently applicable to the site.
Evacuation (6): Adequate flood warning is to be available to allow safe and orderly evacuation without increased reliance upon SES or other authorised emergency services personnel.	Due to the short warning time, the recommended strategy is to adopt a shelter in place emergency flood response. Subject to emergency combat authorities organising evacuation before the onset of flood causing precipitation, the site has access to Blaxland Rd and Epping Rd which are likely evacuation avenues due to access to emergency facilities at the Ryde Hospital or access to the Hills Motorway.
Management and Design (3): Applicant is to demonstrate that sufficient area is available to store goods above the 1% AEP (100 year ARI) flood level plus 0.5 metre freeboard.	All floor levels protected to the 1% AEP + 500mm freeboard as shown in Section 6

Management and Design (4): No storage of materials below the Flood Planning Level (1% AEP flood plus 0.5 metre freeboard) which may cause pollution or be potentially hazardous during any flood.	All floor levels protected to the 1% AEP + 500mm freeboard as shown in Section 6. No known hazardous material storage proposed as part of the development.

Ministerial Directions – Section 4.1 - Flooding

Objective	GRC Response
The objectives of this direction are to: *(a) ensure that development of flood prone land is consistent with the NSW Government's Flood Prone Land Policy and the principles of the Floodplain Development Manual 2005, (now 2023) and*	Compliance with controls and objectives of Parramatta Council DCP and LEP as demonstrated in the tables above clearly indicates that the development is consistent with Government policy and the NSW Floodplain Development Manual (NSW, 2005) and (NSW, 2023).
(b) ensure that the provisions of an LEP that apply to flood prone land are commensurate with flood behaviour and includes consideration of the potential flood impacts both on and off the subject land.	The table above responds to Section 5.21 of the Parramatta City Council LEP.
Application	
This direction applies to all relevant planning authorities that are responsible for flood prone land when preparing a planning proposal that creates, removes or alters a zone or a provision that affects flood prone land.	No response required.
Application	
(1) A planning proposal must include provisions that give effect to and are consistent with: *(a) the NSW Flood Prone Land Policy,*	As per the NSW Government website (https://www.environment.nsw.gov.au/topics/water/floodplains/floodplain-manual#:~:text=The%20main%20objective%20of%20the,development%20of%20flood%2Dprone%20land.) …*"The main objective of the Flood Prone Land Policy is to reduce the impact of flooding and flood liability on owners and occupiers of flood-prone property and reduce public and private losses. The policy recognises the benefits of use, occupation and development of flood-prone land."* The proposed works that are described by the Planning Proposal meet FPL (see Section 6) and off-site impact requirements (see Section 7 and figure set C). Egress via Rawson Street avoids all interaction with hazardous mainstream flooding. This condition has been met and responses to the DCP and LEP controls above further illustrate this.

(b) the principles of the Floodplain Development Manual 2005,	Key principles of the NSW FDM are that no development should occur in floodway, floor levels should meet FPL requirements and flood risk should be managed. All three key principles are met by the proposed works. Responses to the DCP and LEP controls above further illustrate this.
(c) the Considering flooding in land use planning guideline 2021, and	The proposed works are consistent with the 2021 guideline in that: the PMF is included in site flood liability analysis, the proposal does not put additional onus on existing flood planning issues, the works are protected from the PMF event (both mainstream and overland flow)
(d) any adopted flood study and/or floodplain risk management plan prepared in accordance with the principles of the Floodplain Development Manual 2005 and adopted by the relevant council.	No such study exists for the site.
(2) A planning proposal must not rezone land within the flood planning area from Recreation, Rural, Special Purpose or Conservation Zones to a Residential, Employment, Mixed Use, W4 Working Waterfront or Special Purpose Zones.	Answered by others.
(3) A planning proposal must not contain provisions that apply to the flood planning area which: *(a) permit development in floodway areas,*	As per Figure A11 no development is proposed in a highly conservative definition of the 1% AEP floodway
(b) permit development that will result in significant flood impacts to other properties,	As per figure set C impact results in the 1% AEP event on adjacent development due to the proposed works
(c) permit development for the purposes of residential accommodation in high hazard areas,	As per figure A07 works aren't proposed in an area of high hazard. Additionally residential levels are well and truly elevated above the 1% AEP mainstream flood level of 83.7 mAHD at the site.
(d) permit a significant increase in the development and/or dwelling density of that land,	Within the FPA as defined by 1% AEP plus 0.5 m the proposed works are minimal. Certainly the dwelling density within the FPA is not being altered by the proposed works. Noting that the FPA includes all areas below 84.2 mAHD based on a FPL of 1% AEP plus 0.5 m.

(e) permit development for the purpose of centre-based childcare facilities, hostels, boarding houses, group homes, hospitals, residential care facilities, respite day care centres and seniors housing in areas where the occupants of the development cannot effectively evacuate,	Development proposed is a mixture of retail and residential. Egress to Rawson Road is readily achieved as is shelter in place. Flood flows pass quickly from the relatively small catchment. Note that the strategy proposed is compliant with DoP EM-01 2022 Guideline "Support for Emergency Services" as the duration of Shelter in Place is minimal.
(f) permit development to be carried out without development consent except for the purposes of exempt development or agriculture. Dams, drainage canals, levees, still require development consent,	Not applicable.
(g) are likely to result in a significantly increased requirement for government spending on emergency management services, flood mitigation and emergency response measures, which can include but are not limited to the provision of road infrastructure, flood mitigation infrastructure and utilities, or	Shelter in place is the only available strategy given the lack of warning. That said relatively safe egress to Rawson Street is available. GRC do not recommend anyone should drive during a rare flood event and the site is well placed to shelter people in place until such time as the event has passed (will be sub one hour given small catchment). Note that the strategy proposed is compliant with DoP EM-01 2022 Guideline "Support for Emergency Services" as the duration of Shelter in Place is minimal.
(h) permit hazardous industries or hazardous storage establishments where hazardous materials cannot be effectively contained during the occurrence of a flood event.	The development is protected from flooding up to the PMF event and further the proposed usage is a retail area and residential accommodation.

Yours Sincerely,

Steve Gray
Director

Email: gray@grchydro.com.au
Tel: +61 413 631 447

Appendix A

BLOCKAGE ASSESSMENT FORM ARR2016

STRUCTURE: **Carlingford Road Culvert**

OPENING WIDTH: **2.6 m Wide 2.3 m High**

DEBRIS TYPE / MATERIAL / L_{10} / SOURCE AREA

Debris Type/Material	L_{10}	Source Area	How Assessed
Floating	1.5 m	Tree branches and sticks falling into channel from trees adjacent –thick growth	Site visit
Urban	0.5 m	Local drainage debris	Site visit
Non-floating	Fine sediments	Moderate erosion hazard.	Site visit

DEBRIS AVAILABILITY (HML) – *for the selected debris type/size and its source area*

Availability	Typical Source Area Characteristics	Notes
High	• *Dense forest, thick vegetation, extensive canopy, difficult to walk through with considerable fallen limbs, leaves and high levels of floor litter.* • *Streams with boulder/cobble beds and steep bed slopes and banks showing signs of substantial past bed/bank movements.* • *Arid areas, where loose vegetation and exposed loose soils occur and vegetation is sparse.* • *Urban areas that are not well maintained and/or old paling fences, sheds, cars and/or stored loose material etc., are present on the floodplain close to the water course.*	
Medium	• *State forest areas with clear understory, grazing land with stands of trees* • *Source areas generally falling between the High and Low categories.*	
Low	• *Well maintained rural lands and paddocks, with minimal outbuildings* • *Streams with moderate to flat slopes and stable beds and banks.* • *Arid areas where vegetation is deep rooted and soils resistant to scour* • *Urban areas that are well maintained with limited debris present in the source area.*	Floating: Urban well-maintained area. Trees with clear understory close to structure Urban: Well-maintained residential area. Non-Floating: Potential for scour during large rainfall events.

DEBRIS MOBILITY (HML) - *for the selected debris type/size and its source area*

Mobility	Typical Source Area Characteristics	Notes
High	• *Steep source area with fast response times and high annual rainfall and/or storm intensities and/or source areas subject to high rainfall intensities with sparse vegetation cover.* • *Receiving streams that frequently overtop their banks.* • *Main debris source areas close to streams*	
Medium	• *Source areas generally falling between the High and Low categories.*	ALL: Large and flat source areas Receiving streams that frequently overtop their banks

Low	• *Low rainfall intensities and large, flat source areas.* • *Receiving streams that Infrequently overtop their banks.* • *Main source areas well away from streams*	

DEBRIS TRANSPORTABILITY (HML) - *for the selected debris type/size and stream characteristics*

Transportability	Typical Transporting Stream Characteristics	Notes
High	• *Steep bed slopes (> 3%).and/or high stream velocity (V>2.5m/sec)* • *Deep stream relative to vertical debris dimension (D>0.5L10)* • *Wide streams relative to horizontal debris dimension. (W>L10)* • *Streams relatively straight and free of constrictions/snag points.* • *High temporal variability in maximum stream flows*	ALL: Flat bed slope ~ 1% Fast stream velocity > 3m/s Depths: D >0.5L10=0.75m Wide streams: W >L10=1.5m Streams relatively straight
Medium	• *Streams generally falling between High and Low categories*	
Low	• *Flat bed slopes (< 1%).and/or low stream velocity (V<1m/sec)* • *Shallow stream relative to vertical debris dimension (D<0.5L10)* • *Narrow streams relative to horizontal debris dimension. (W<L10)* • *Streams meander with frequent constrictions/snag points.* • *Low temporal variability in maximum stream flows*	

SITE BASED DEBRIS POTENTIAL 1%AEP (HML) - *for the selected debris type/size arriving at the site*

Debris Potential	Combinations of the Above (any order)	Notes		
High	*HHH or HHM*			
Medium	*MMM or HML or HMM or HLL*	LMH	LMH	LMH
Low	*LLL or MML or MLL*			

AEP ADJUSTED SITE DEBRIS POTENTIAL (HML) - *for the selected debris type/size*

Event AEP	At Site 1% AEP Debris Potential			AEP Adjusted at Site Debris Potential		
	High	Medium	Low			
AEP > 5% (frequent)	*Medium*	*Low*	*Low*	Low	Low	Low
AEP 5% - AEP 0.5%	*High*	*Medium*	*Low*	Medium	Medium	Medium
AEP < 0.5%	*High*	*High*	*Medium*	*High*	*High*	*High*

MOST LIKELY DESIGN INLET BLOCKAGE LEVEL (B_{DES}%) *for the selected debris type/size*

Control Dimension Inlet Width W (m)	At Site 1% AEP Debris Potential		
	High	Medium	Low
$W < L_{10}$	*100%*	*50%*	*25%*
$L_{10} \leq W \leq 3L_{10}$	*20%*	*10%*	*0%*
$W > 3L_{10}$	*10%*	*0%*	*0%*

Event AEP	Bdes% Urban
AEP > 5% (frequent)	*0%*
AEP 5% - AEP 0.5%	*10%*
AEP < 0.5%	*20%*

LIKELIHOOD OF SEDIMENT BEING DEPOSITED IN WATERWAY (HML)

Peak Velocity through Structure (m/s)	Particle Type				
	Clay/Silt	Sand	Gravel	Cobbles	Boulders
>= 3	L	L	L	L	M
1.0 to 3	L	L	L	M	M
0.5 to 1	L	L	L	M	H
0.1 to 0.5	L	L	M	H	H
< 0.1	L	M	H	H	H

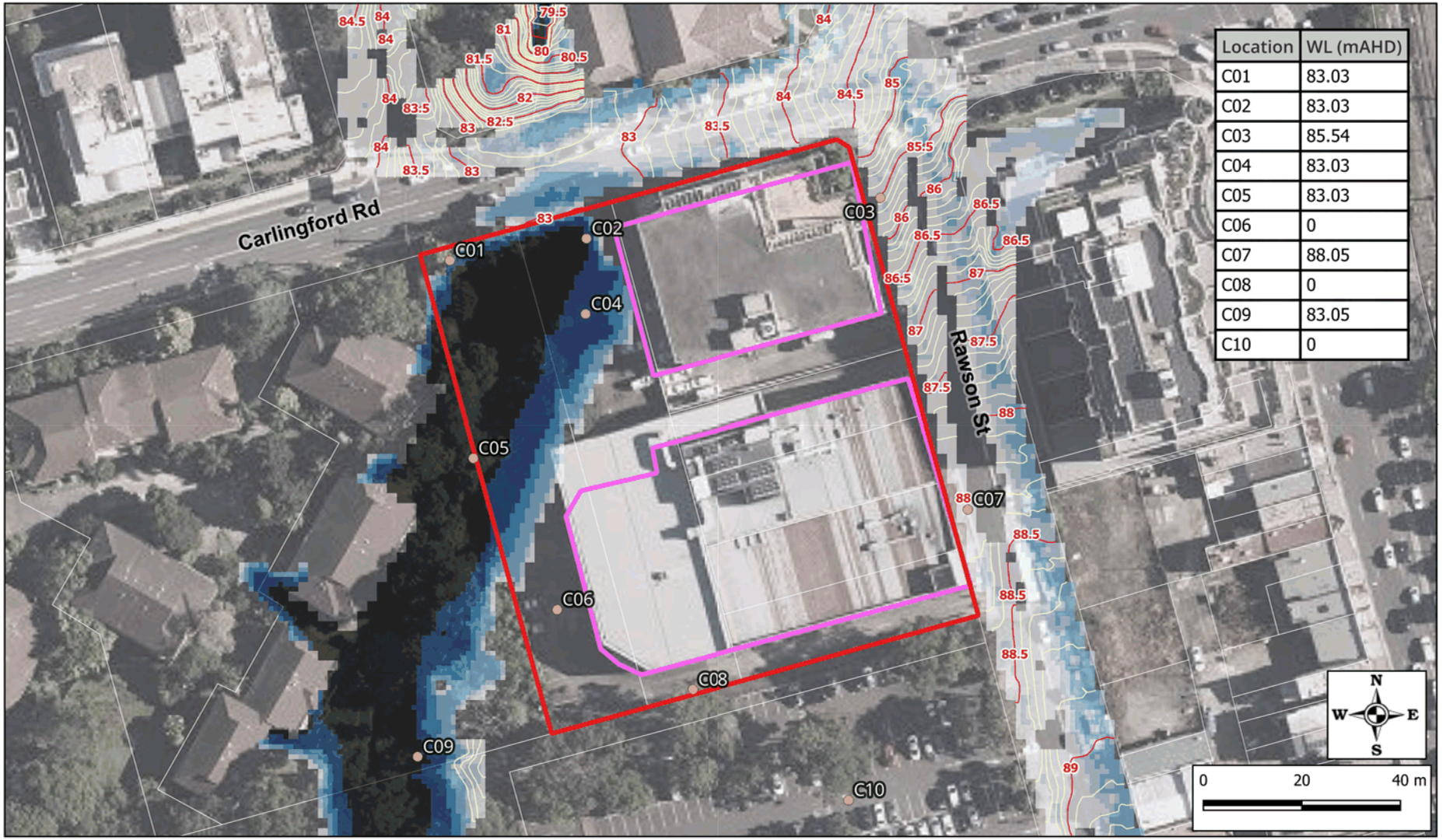
MOST LIKELY DEPOSITIONAL BLOACKAGE LEVELS – B_{DES}%

Likelihood that deposition will occur	AEP Adjusted Debris Potential		
	High	Medium	Low
High	100%	60%	25%
Medium	60%	40%	15%
Low	25%	15%	0%

Event AEP	Bdes% Non-Floating
AEP > 5% (frequent)	0%
AEP 5% - AEP 0.5%	15%
AEP < 0.5%	25%

ESTIMATED BLOCKAGE LEVELS – B_{DES}%

Event AEP	Bdes% Floating	Bdes% Non-Floating	Bdes% Final
AEP > 5% (frequent)	0%	0%	0%
AEP 5% - AEP 0.5%	10%	15%	15%
AEP < 0.5%	20%	25%	25%



Location	WL (mAHD)
C01	83.03
C02	83.03
C03	85.54
C04	83.03
C05	83.03
C06	0
C07	88.05
C08	0
C09	83.05
C10	0

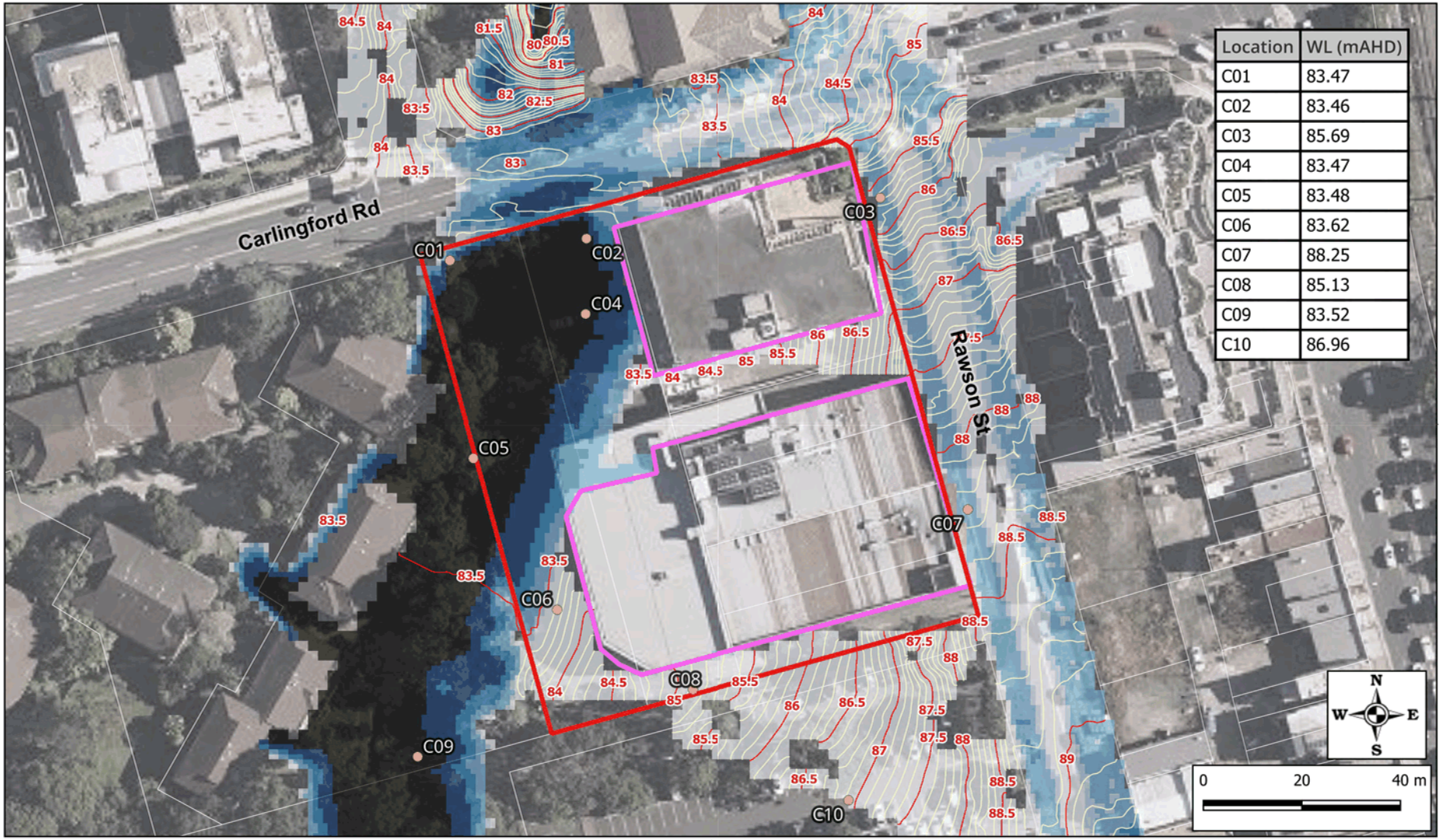
Flood Depths (m)
- 0.00 - 0.05
- 0.05 - 0.10
- 0.10 - 0.30
- 0.30 - 0.50
- 0.50 - 1.00
- > 1.00

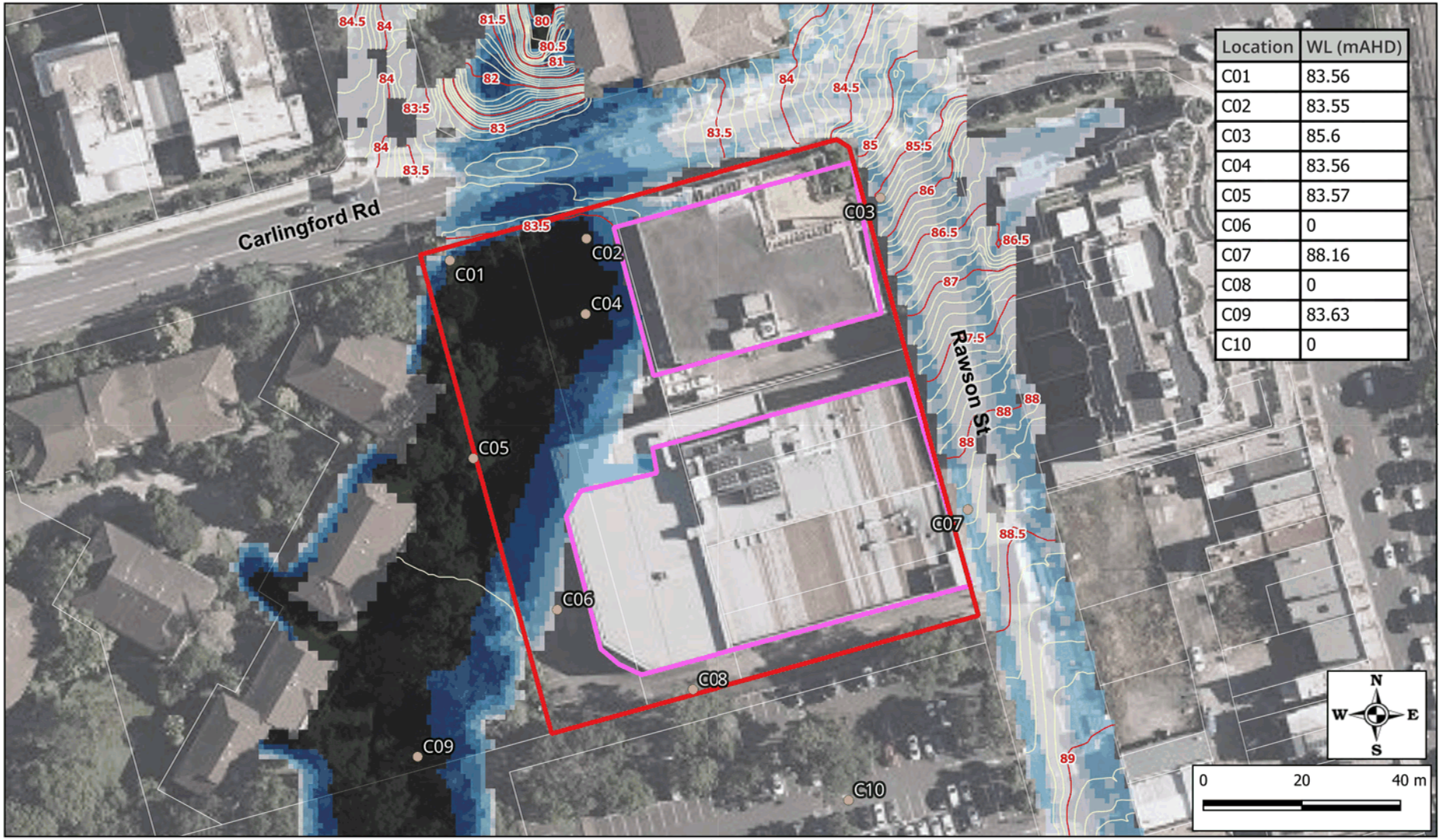
Flood Level Conoturs (mAHD)
- Major (Spacing = 0.50 m)
- Minor (Spacing = 0.10 m)
- Subject Site
- Site's Buildings
- Cadastral Boundaries

Water Level Sample Points

TITLE:	**5% AEP 15% Blockage - Peak Depths and Levels (Existing)**		
PROJECT:	**Epping Town Centre**		
PROJECT No.	**210046**		
DATE: **11-2023**	SCALE: 1:1,000	FIGURE No. **A01**	

grc HYDRO


Carlingford Rd
Rawson St
C01
C02
C03
C04
C05
C06
C07
C08
C09
C10
Location | WL (mAHD)
C01 | 83.47
C02 | 83.46
C03 | 85.69
C04 | 83.47
C05 | 83.48
C06 | 83.62
C07 | 88.25
C08 | 85.13
C09 | 83.52
C10 | 86.96
N
W
E
S
0
20
40 m
Flood Depths (m)
0.00 - 0.05
0.05 - 0.10
0.10 - 0.30
0.30 - 0.50
0.50 - 1.00
> 1.00
Flood Level Conoturs (mAHD)
Major (Spacing = 0.50 m)
Minor (Spacing = 0.10 m)
Subject Site
Site's Buildings
Cadastral Boundaries
Water Level Sample Points
TITLE: 1% AEP 15% Blockage - Peak Depths and Levels (Existing)
PROJECT: Epping Town Centre
PROJECT No. 210046
DATE: 11-2023
SCALE: 1:1,000
FIGURE No. A02
grc HYDRO



Location	WL (mAHD)
C01	83.56
C02	83.55
C03	85.6
C04	83.56
C05	83.57
C06	0
C07	88.16
C08	0
C09	83.63
C10	0

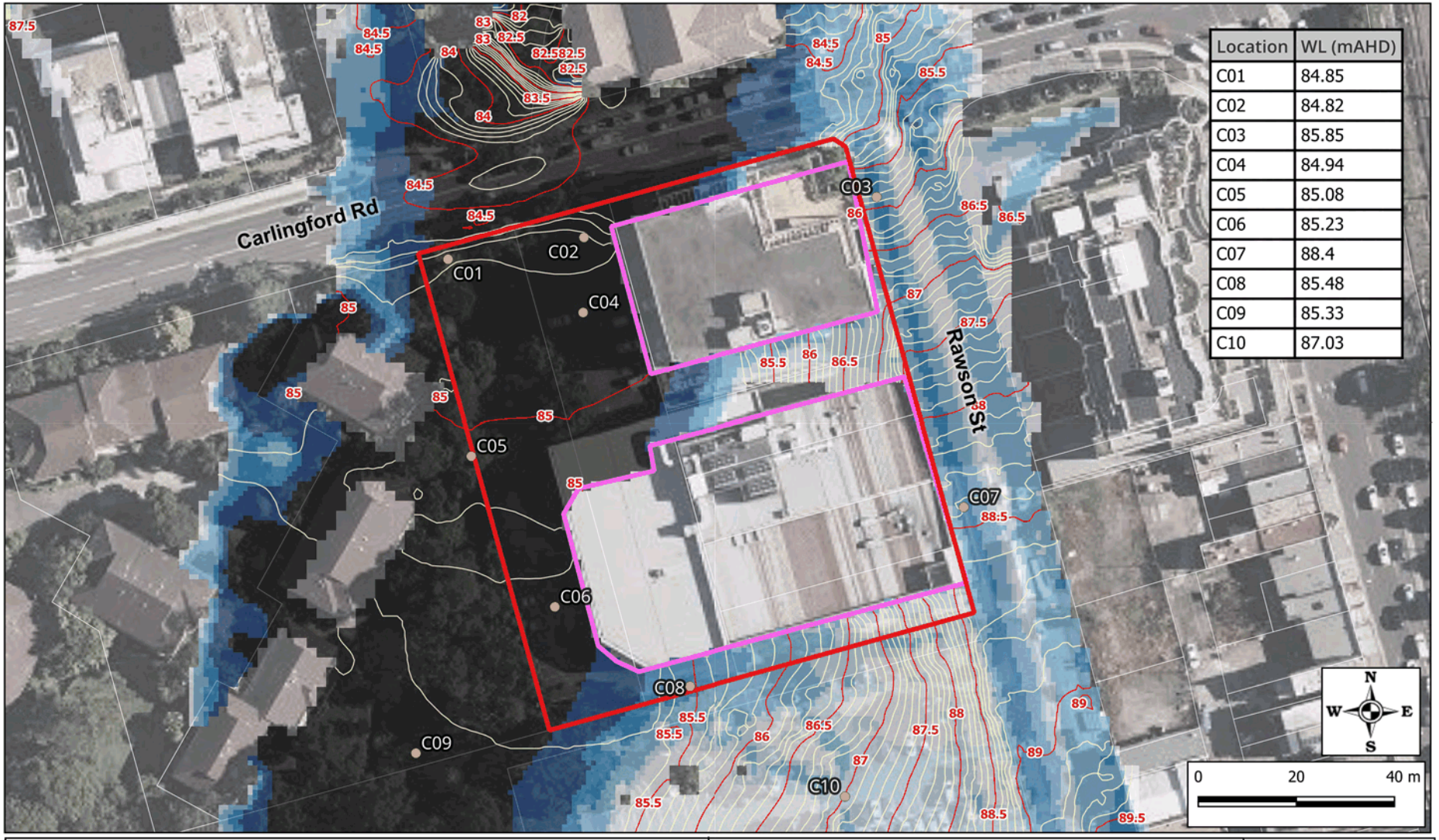
Flood Depths (m)
- 0.00 - 0.05
- 0.05 - 0.10
- 0.10 - 0.30
- 0.30 - 0.50
- 0.50 - 1.00
- > 1.00

Flood Level Conoturs (mAHD)
- Major (Spacing = 0.50 m)
- Minor (Spacing = 0.10 m)
- Subject Site
- Site's Buildings
- Cadastral Boundaries

Water Level Sample Points

TITLE:	**0.5% AEP 15% Blockage - Peak Depths and Levels (Existing)**		
PROJECT:	**Epping Town Centre**		
PROJECT No.	**210046**		
DATE:	**11-2023**	SCALE: 1:1,000	FIGURE No. **A03**

grc HYDRO



Location	WL (mAHD)
C01	84.85
C02	84.82
C03	85.85
C04	84.94
C05	85.08
C06	85.23
C07	88.4
C08	85.48
C09	85.33
C10	87.03

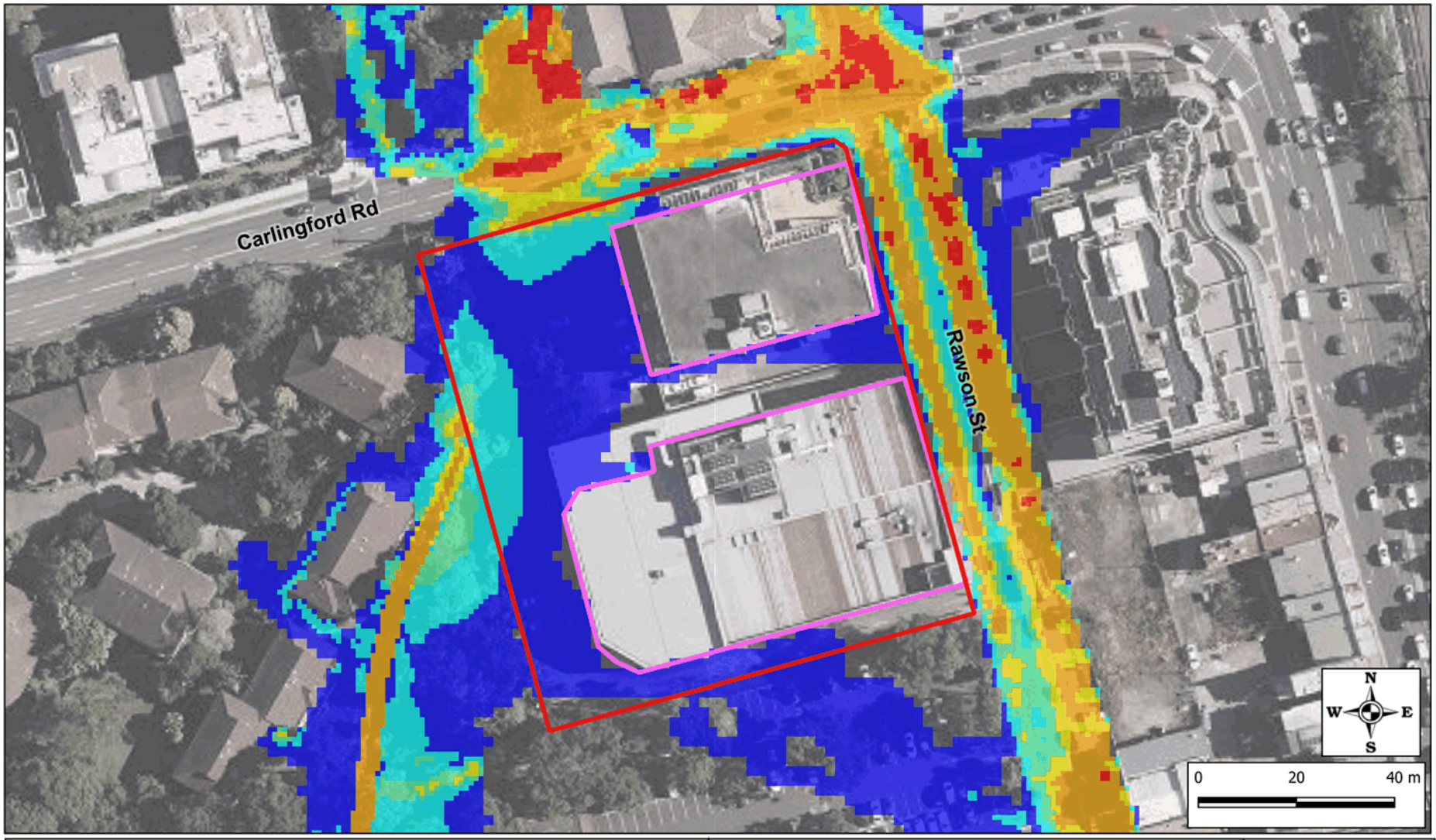
Flood Depths (m)
- 0.00 - 0.05
- 0.05 - 0.10
- 0.10 - 0.30
- 0.30 - 0.50
- 0.50 - 1.00
- > 1.00

Flood Level Conoturs (mAHD)
- Major (Spacing = 0.50 m)
- Minor (Spacing = 0.10 m)
- Subject Site
- Site's Buildings
- Cadastral Boundaries

Water Level Sample Points

TITLE:	**PMF 25% Blockage - Peak Depths and Levels (Existing)**
PROJECT:	**Epping Town Centre**
PROJECT No.	**210046**
DATE: **11-2023**	SCALE: 1:1,000
FIGURE No.	**A04**

grc HYDRO



Flood Velocity (m/s)

- < 0.25
- 0.25 to 0.50
- 0.50 to 0.75
- 0.75 to 1.00
- 1.00 to 2.00
- > 2.00
- Subject Site
- Site's Buildings
- Cadastral Boundaries

TITLE:	**1% AEP 15% Blockage - Peak Velocities (Existing)**		
PROJECT:	**Epping Town Centre**		
PROJECT No.	**210046**		
DATE: **11-2023**	SCALE: 1:1,000	FIGURE No. **A05**	

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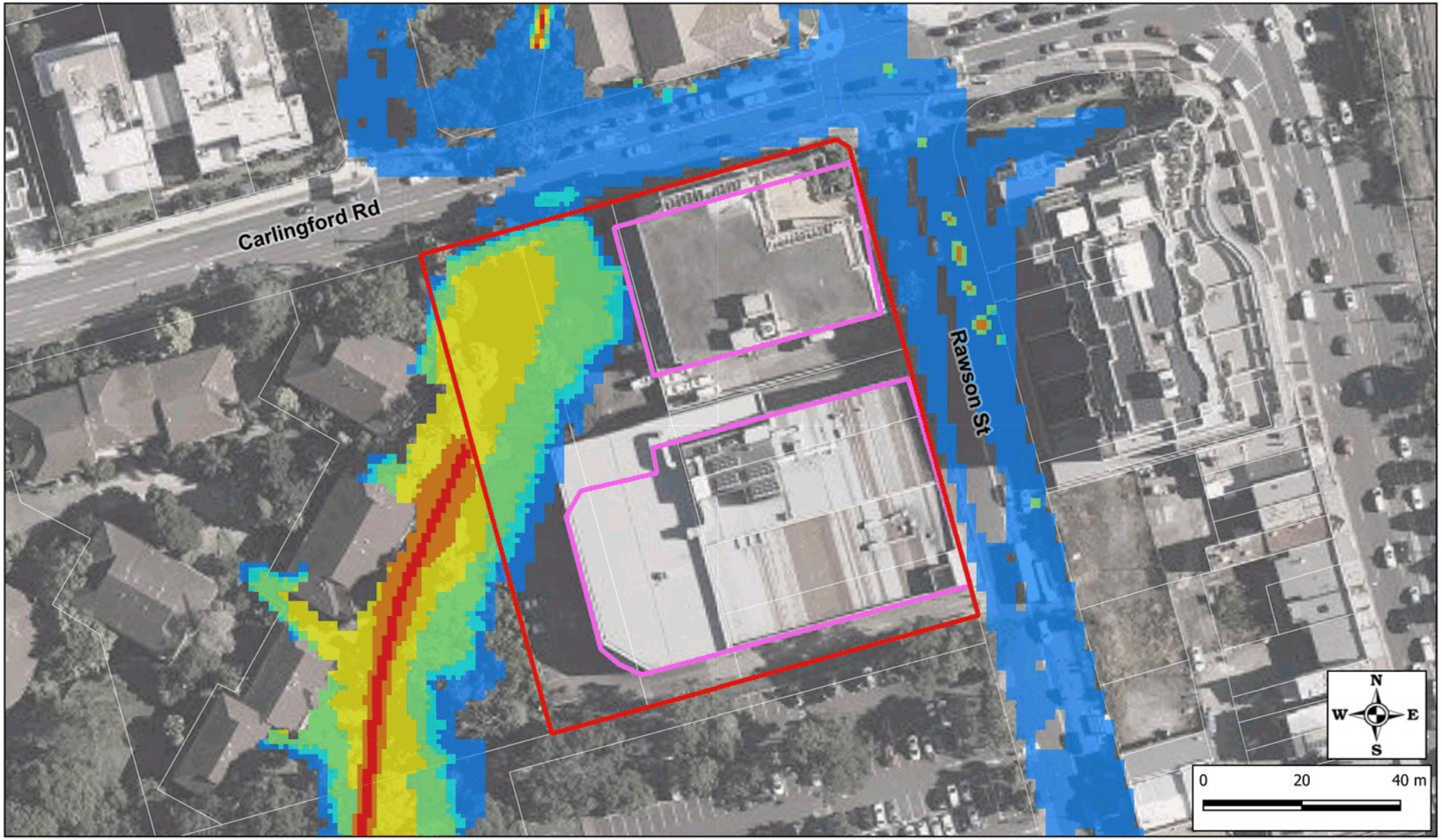

Flood Hazard

H1
H2
H3
H4
H5
H6

Subject Site
Site's Buildings
Cadastral Boundaries

TITLE:	**5% AEP 15% Blockage - Peak Flood Hazard (Existing)**		
PROJECT:	**Epping Town Centre**		
PROJECT No.	**210046**		
DATE: **11-2023**	SCALE: 1:1,000	FIGURE No. **A06**	

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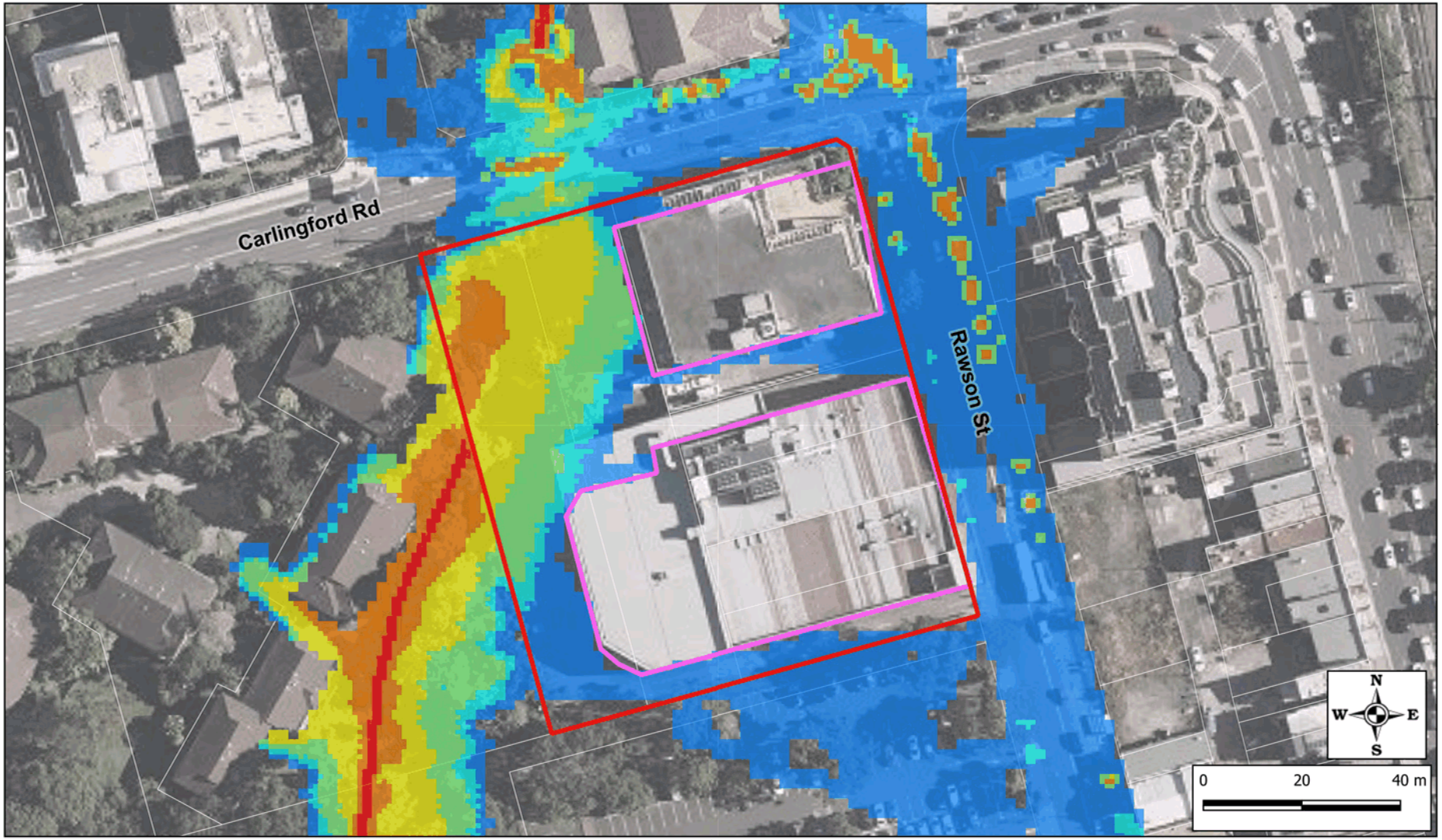


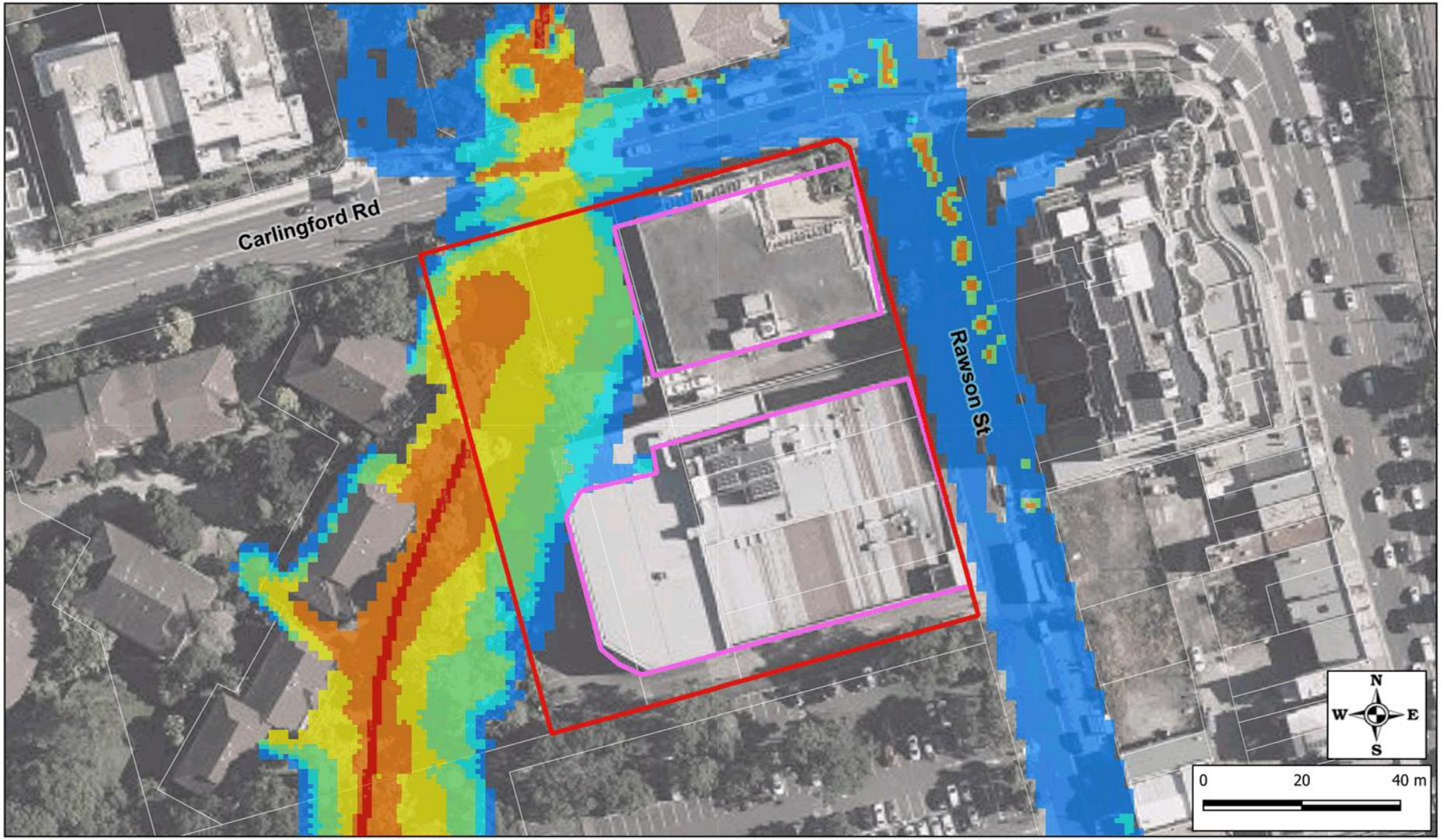
Flood Hazard

H1 H2 H3 H4 H5 H6

Subject Site
Site's Buildings
Cadastral Boundaries

TITLE:	**1% AEP 15% Blockage - Peak Flood Hazard (Existing)**		
PROJECT:	**Epping Town Centre**		
PROJECT No.	**210046**		
DATE: **11-2023**	SCALE: 1:1,000	FIGURE No. **A07**	

grc HYDRO



Flood Hazard

H1 H2 H3 H4 H5 H6

Subject Site
Site's Buildings
Cadastral Boundaries

TITLE:	**0.5% AEP 15% Blockage - Peak Flood Hazard (Existing)**		
PROJECT:	**Epping Town Centre**		
PROJECT No.	**210046**		
DATE: **11-2023**	SCALE: 1:1,000	FIGURE No. **A08**	

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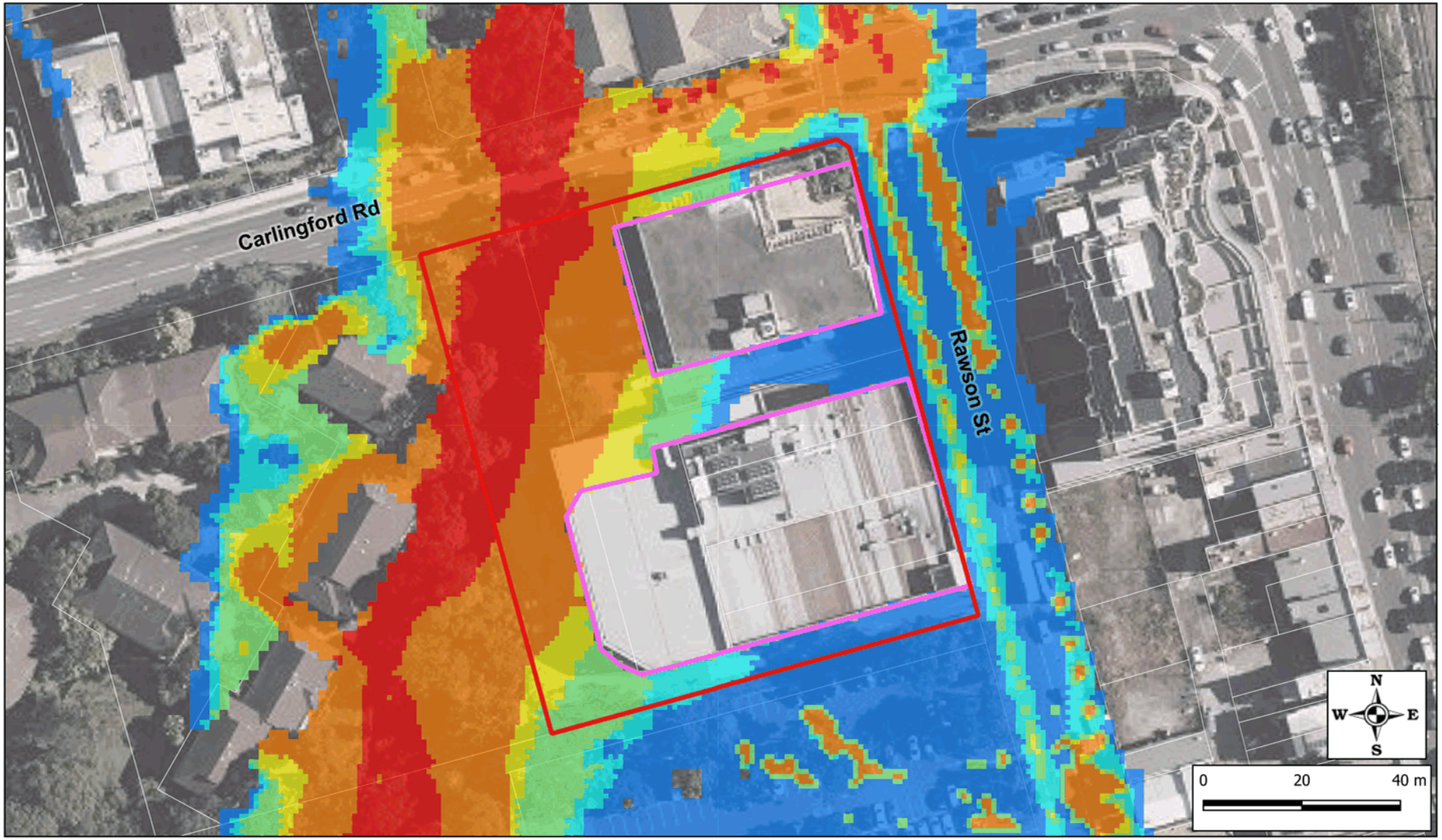

Flood Hazard

H1
H2
H3
H4
H5
H6

Subject Site
Site's Buildings
Cadastral Boundaries

TITLE:	**PMF 25% Blockage - Peak Flood Hazard (Existing)**		
PROJECT:	**Epping Town Centre**		
PROJECT No.	**210046**		
DATE:	**11-2023**	SCALE: 1:1,000	FIGURE No. **A09**

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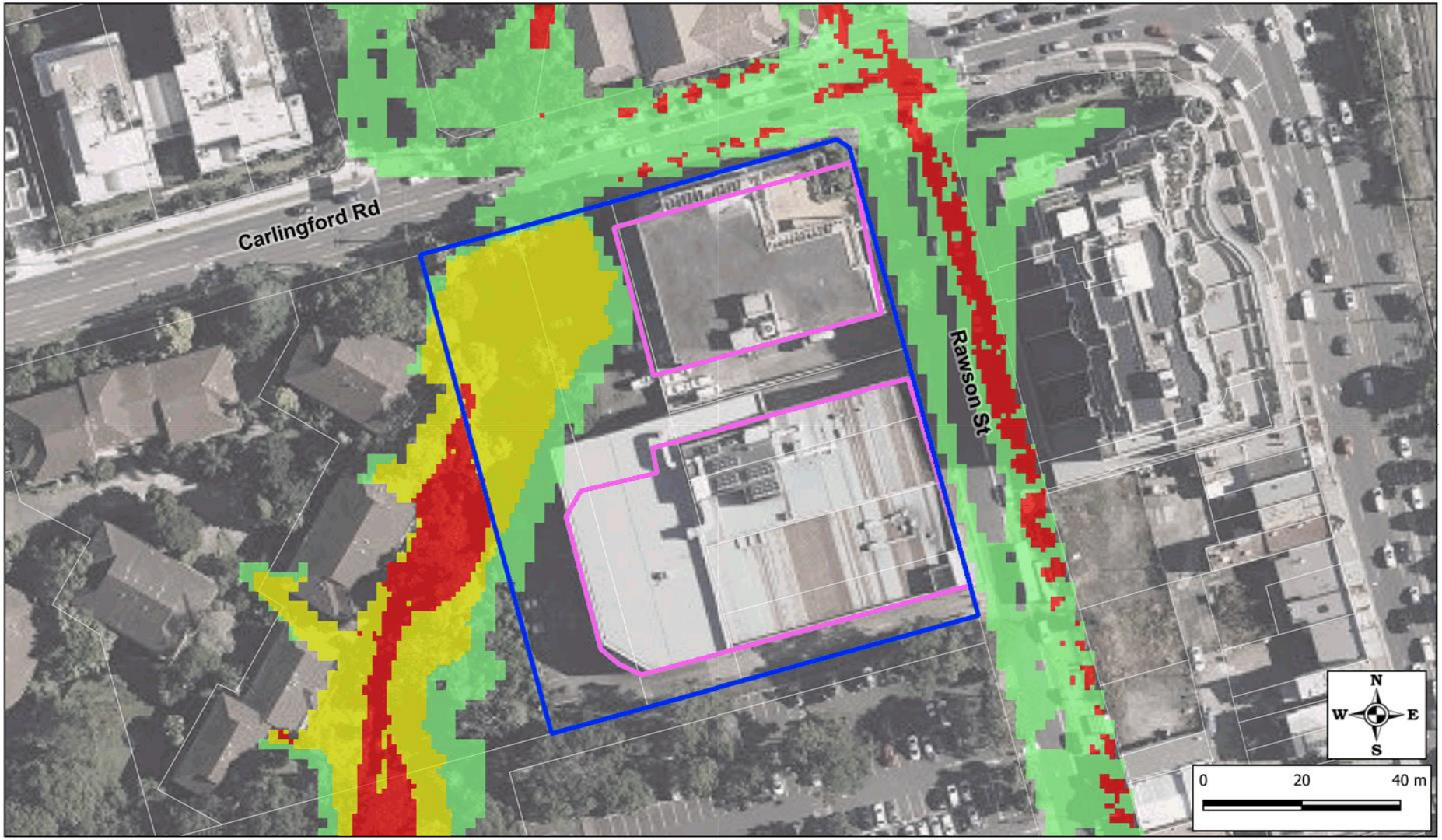
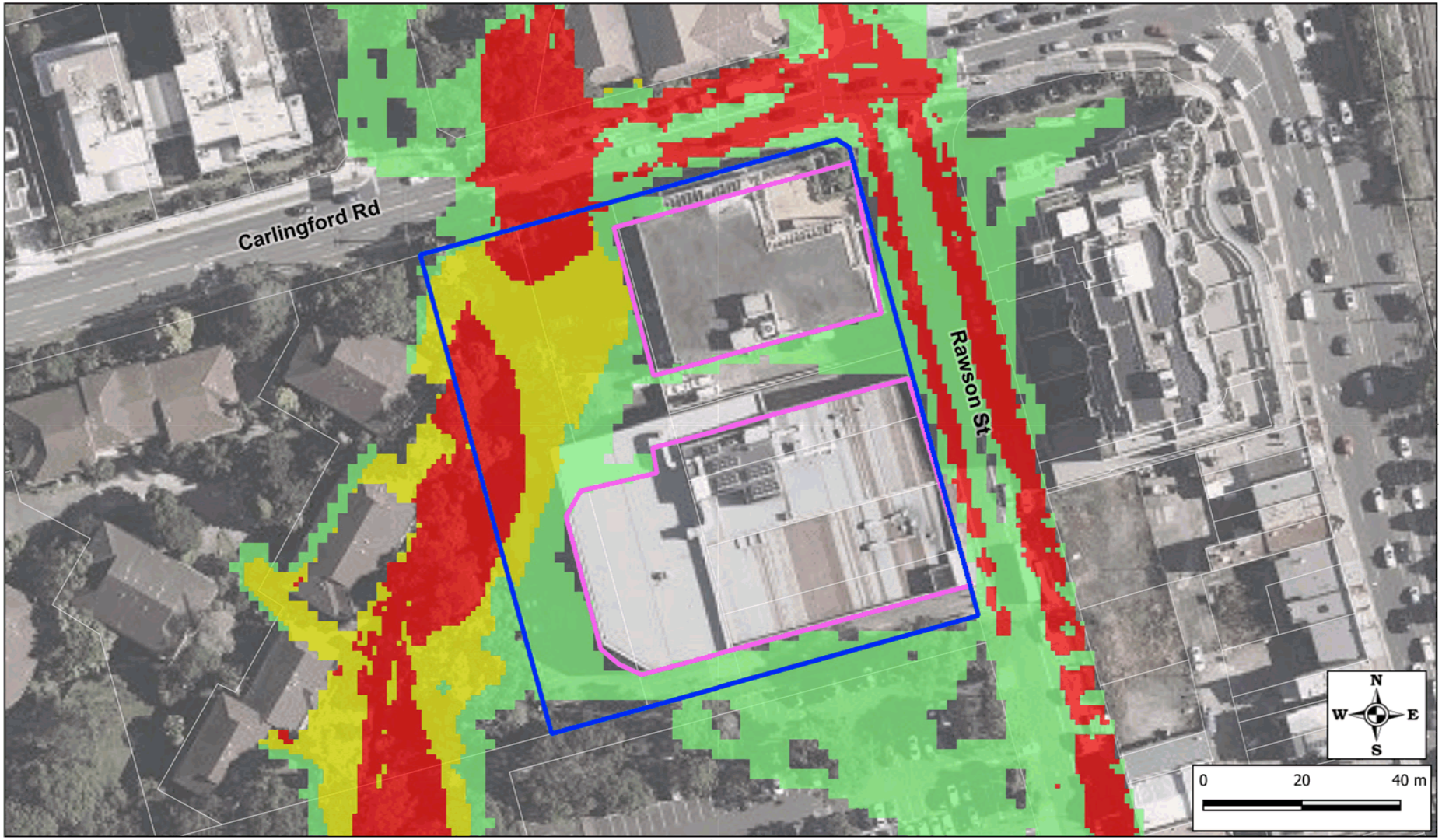


Flood Function
- Flow Conveyance
- Flood Storage
- Flood Fringe

- Subject Site
- Site's Buildings
- Cadastral Boundaries

TITLE:	**5% AEP 15% Blockage - Hydraulic Flood Function (Existing)**		
PROJECT:	**Epping Town Centre**		
PROJECT No.	**210046**		
DATE: **11-2023**	SCALE: 1:1,000	FIGURE No. **A10**	

grc HYDRO

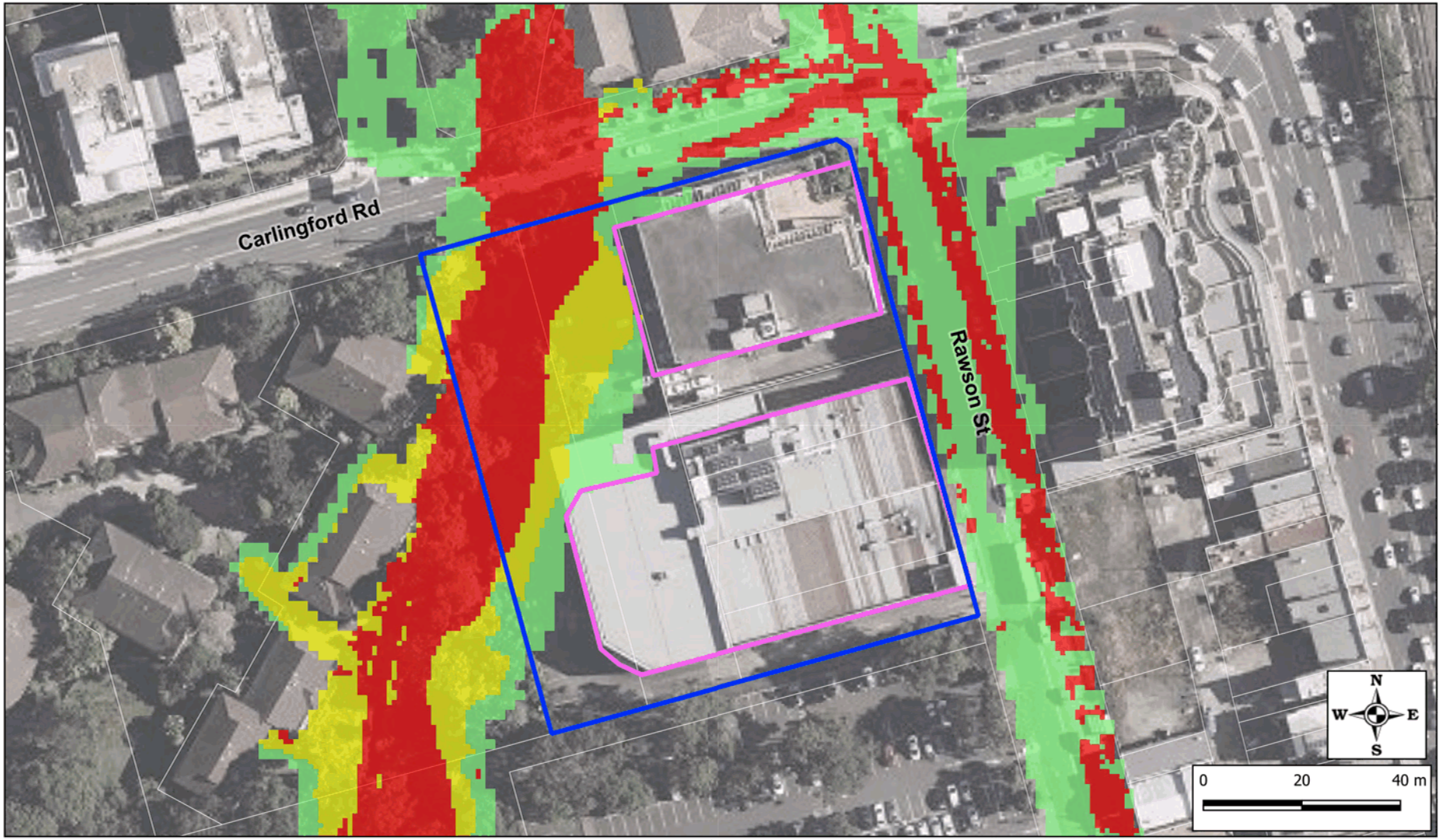


Flood Function
- Flow Conveyance
- Flood Storage
- Flood Fringe

- Subject Site
- Site's Buildings
- Cadastral Boundaries

TITLE:	**1% AEP 15% Blockage - Hydraulic Flood Function (Existing)**		
PROJECT:	**Epping Town Centre**		
PROJECT No.	**210046**		
DATE: **11-2023**	SCALE: 1:1,000	FIGURE No. **A11**	

grc HYDRO

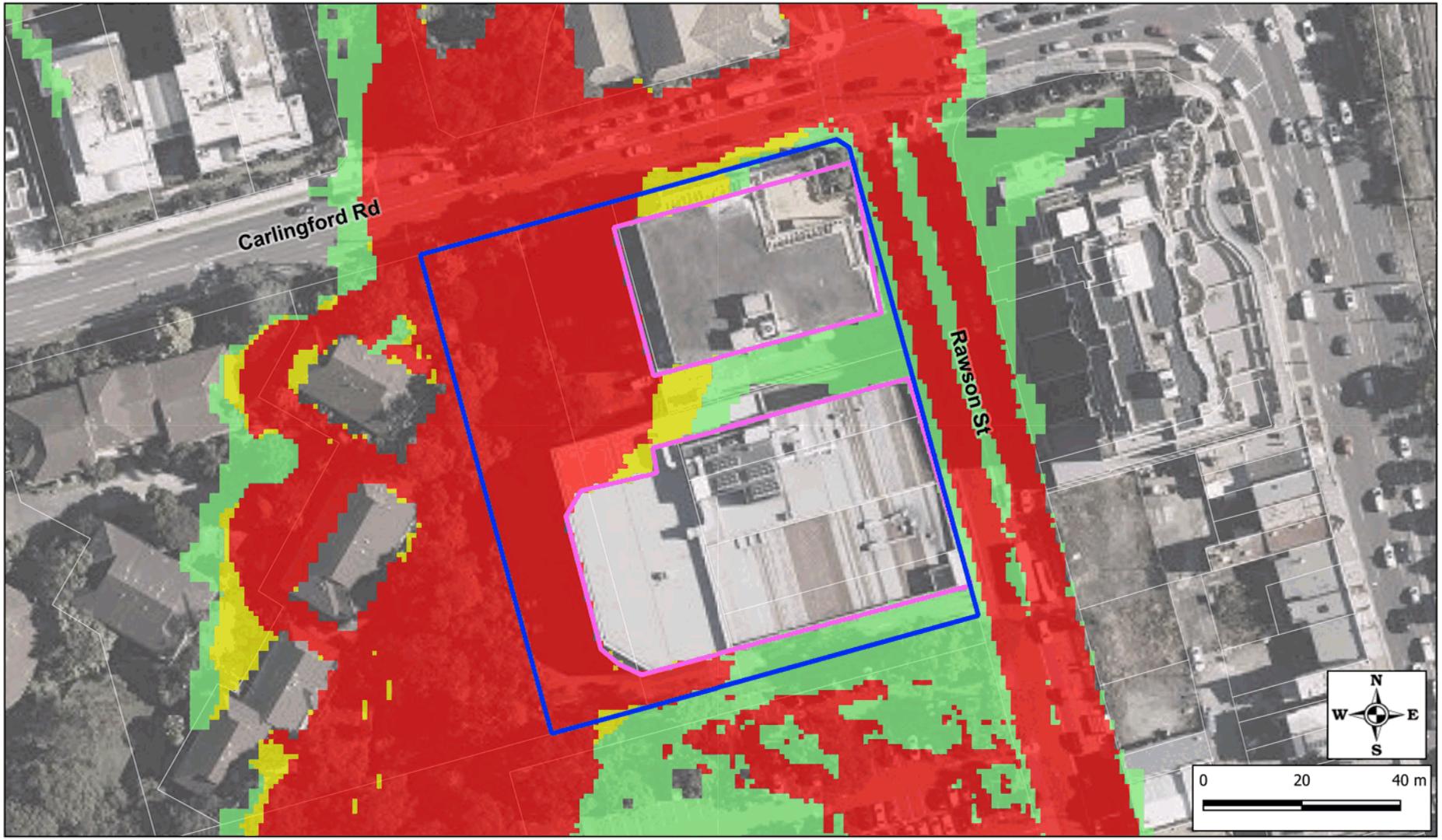


Flood Function
- Flow Conveyance
- Flood Storage
- Flood Fringe

- Subject Site
- Site's Buildings
- Cadastral Boundaries

TITLE:	**0.5% AEP 15% Blockage - Hydraulic Flood Function (Existing)**		
PROJECT:	**Epping Town Centre**		
PROJECT No.	**210046**		
DATE: **11-2023**	SCALE: 1:1,000	FIGURE No. **A12**	

grc HYDRO

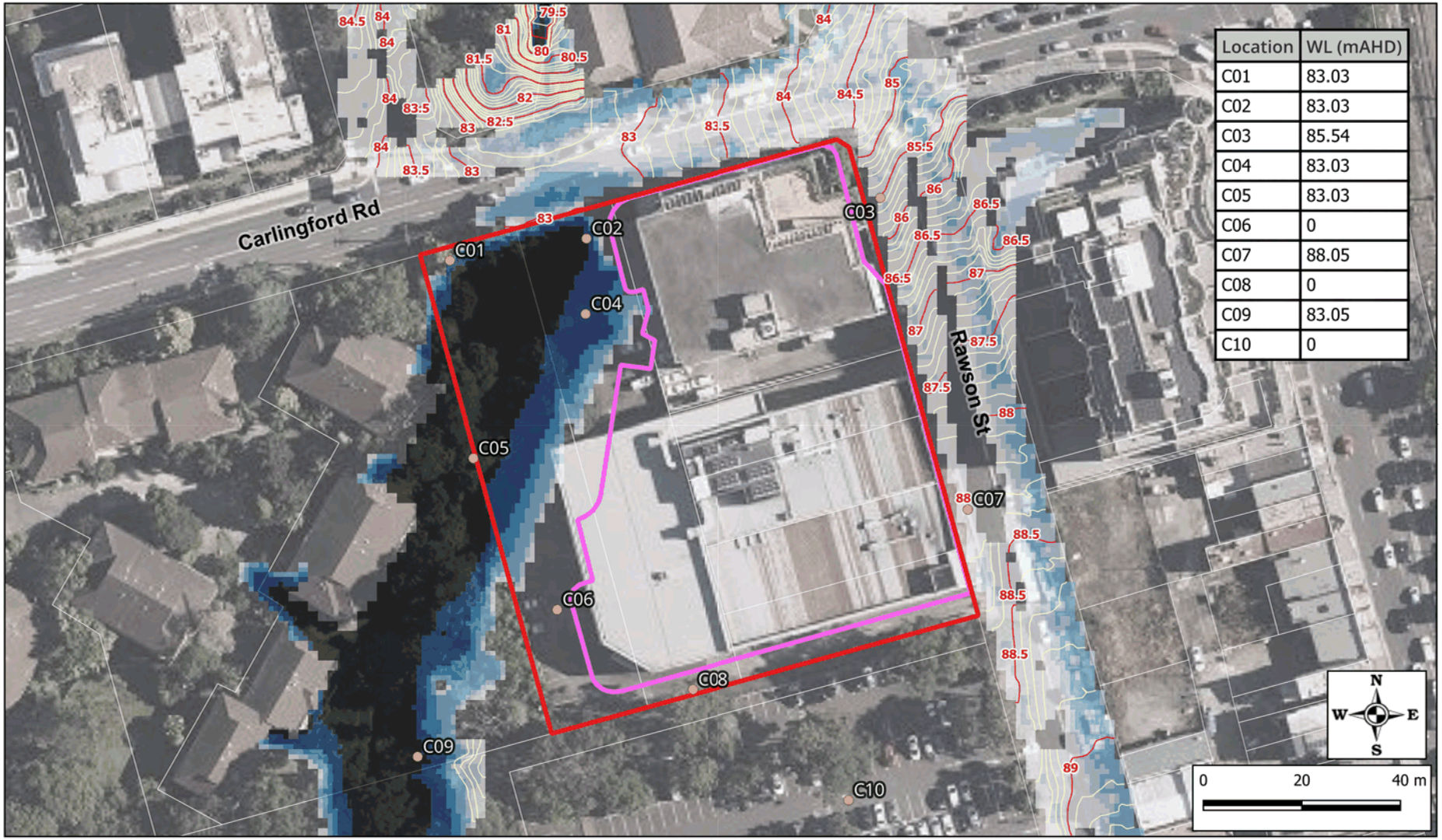


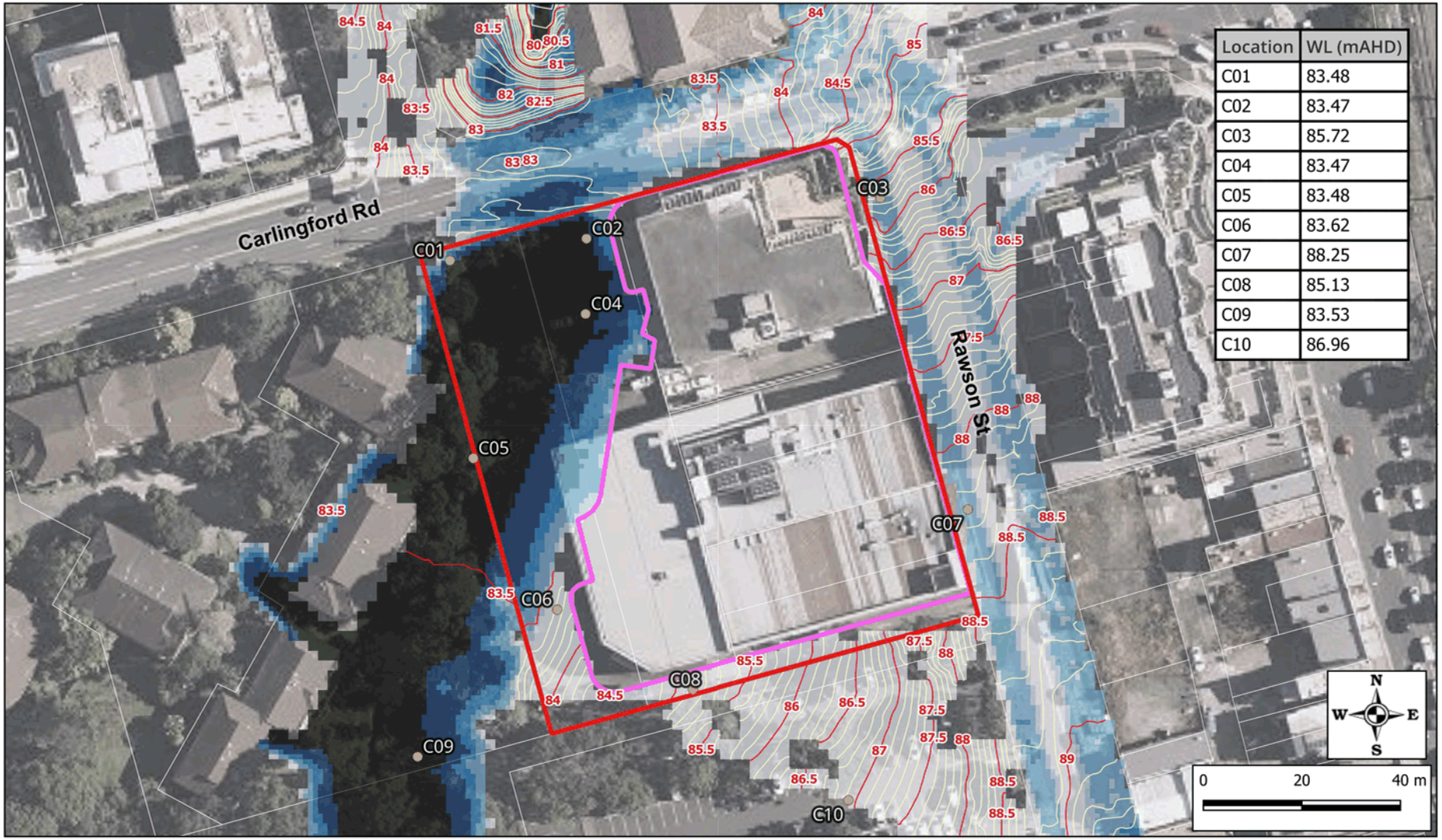
Flood Function
- Flow Conveyance
- Flood Storage
- Flood Fringe

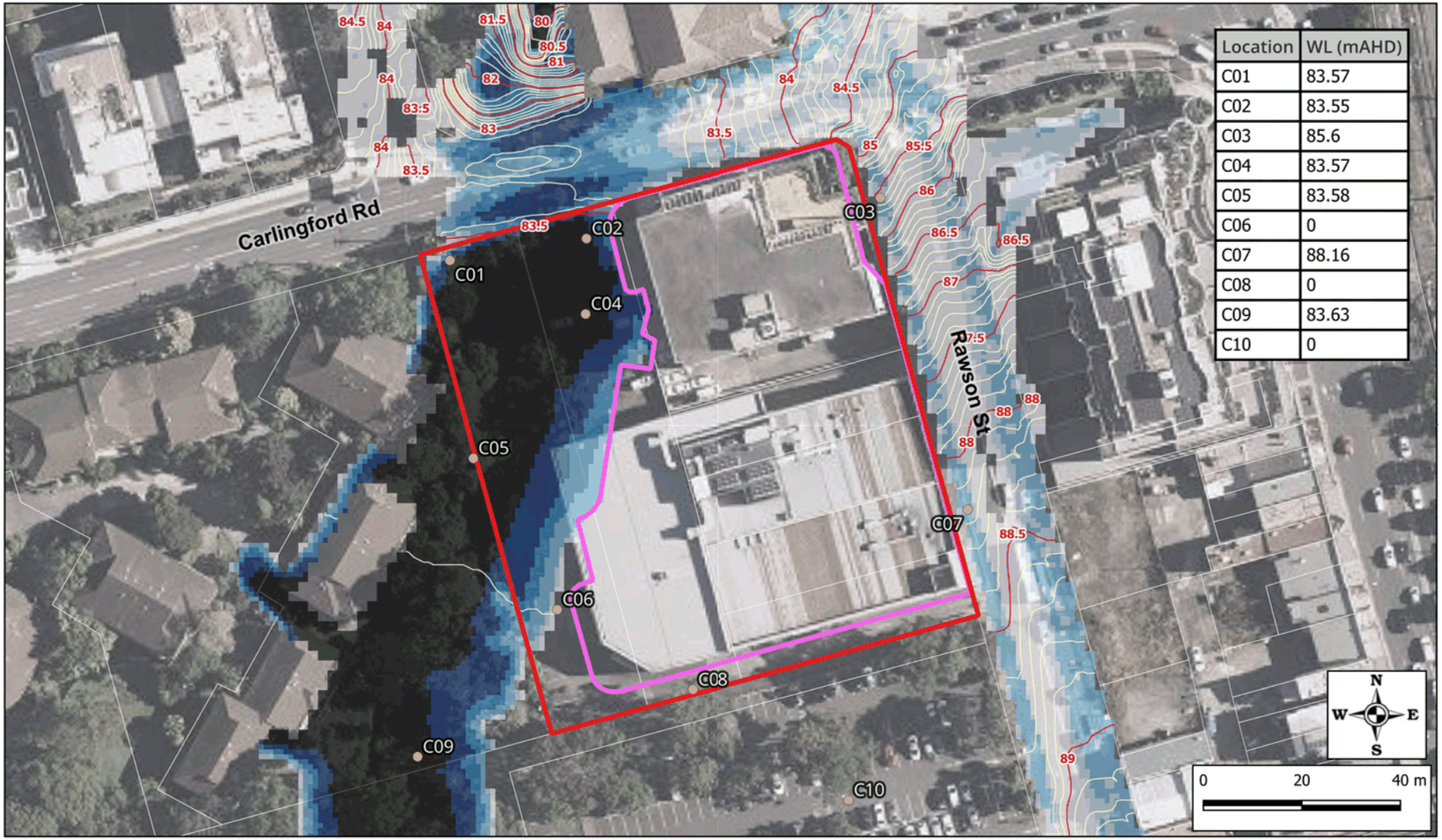
- Subject Site
- Site's Buildings
- Cadastral Boundaries

TITLE:	**PMF 25% Blockage - Hydraulic Flood Function (Existing)**		
PROJECT:	**Epping Town Centre**		
PROJECT No.	**210046**		
DATE: **11-2023**	SCALE: 1:1,000	FIGURE No. **A13**	

grc HYDRO


Carlingford Rd
Rawson St
C01
C02
C03
C04
C05
C06
C07
C08
C09
C10
Location	WL (mAHD)
C01	83.03
C02	83.03
C03	85.54
C04	83.03
C05	83.03
C06	0
C07	88.05
C08	0
C09	83.05
C10	0
N
W
E
S
0
20
40 m
Flood Depths (m)
0.00 - 0.05
0.05 - 0.10
0.10 - 0.30
0.30 - 0.50
0.50 - 1.00
> 1.00
Flood Level Conoturs (mAHD)
Major (Spacing = 0.50 m)
Minor (Spacing = 0.10 m)
Subject Site
Site's Buildings
Cadastral Boundaries
Water Level Sample Points
TITLE: 5% AEP 15% Blockage - Peak Depths and Levels (Post Development)
PROJECT: Epping Town Centre
PROJECT No. 210046
DATE: 11-2023
SCALE: 1:1,000
FIGURE No. B01
grc HYDRO


Carlingford Rd
Rawson St
C01
C02
C03
C04
C05
C06
C07
C08
C09
C10
Location	WL (mAHD)
C01	83.48
C02	83.47
C03	85.72
C04	83.47
C05	83.48
C06	83.62
C07	88.25
C08	85.13
C09	83.53
C10	86.96
N
W
E
S
0
20
40 m
Flood Depths (m)
0.00 - 0.05
0.05 - 0.10
0.10 - 0.30
0.30 - 0.50
0.50 - 1.00
> 1.00
Flood Level Conoturs (mAHD)
Major (Spacing = 0.50 m)
Minor (Spacing = 0.10 m)
Subject Site
Site's Buildings
Cadastral Boundaries
Water Level Sample Points
TITLE: 1% AEP 15% Blockage - Peak Depths and Levels (Post Development)
PROJECT: Epping Town Centre
PROJECT No. 210046
DATE: 11-2023
SCALE: 1:1,000
FIGURE No. B02
grc HYDRO



Location	WL (mAHD)
C01	83.57
C02	83.55
C03	85.6
C04	83.57
C05	83.58
C06	0
C07	88.16
C08	0
C09	83.63
C10	0

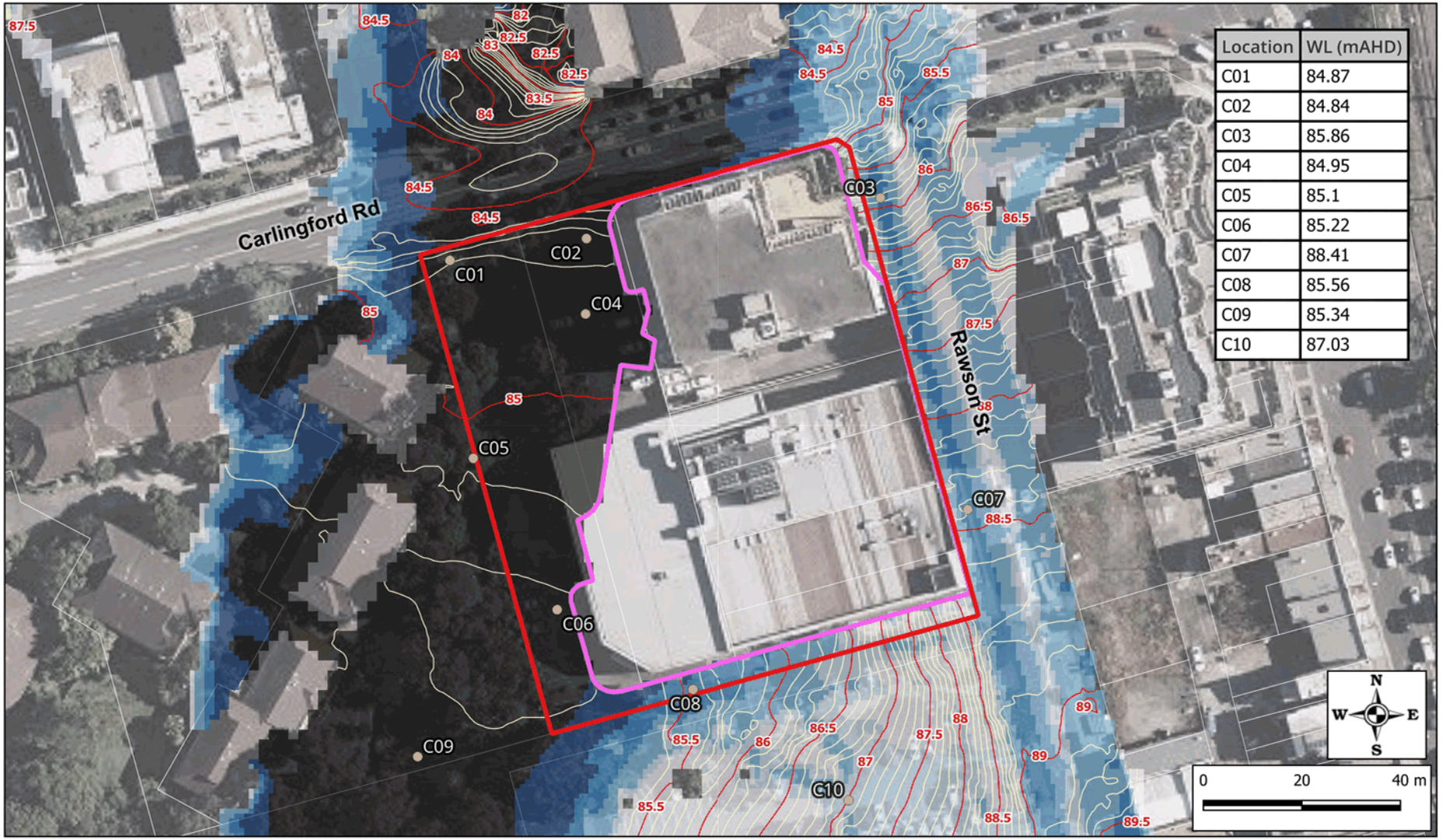
Flood Depths (m)
- 0.00 - 0.05
- 0.05 - 0.10
- 0.10 - 0.30
- 0.30 - 0.50
- 0.50 - 1.00
- > 1.00

Flood Level Conoturs (mAHD)
- Major (Spacing = 0.50 m)
- Minor (Spacing = 0.10 m)
- Subject Site
- Site's Buildings
- Cadastral Boundaries

Water Level Sample Points

TITLE:	**0.5% AEP 15% Blockage - Peak Depths and Levels (Post Development)**		
PROJECT:	**Epping Town Centre**		
PROJECT No.	**210046**		
DATE: **11-2023**	SCALE: 1:1,000	FIGURE No. **B03**	

grc HYDRO



Location	WL (mAHD)
C01	84.87
C02	84.84
C03	85.86
C04	84.95
C05	85.1
C06	85.22
C07	88.41
C08	85.56
C09	85.34
C10	87.03

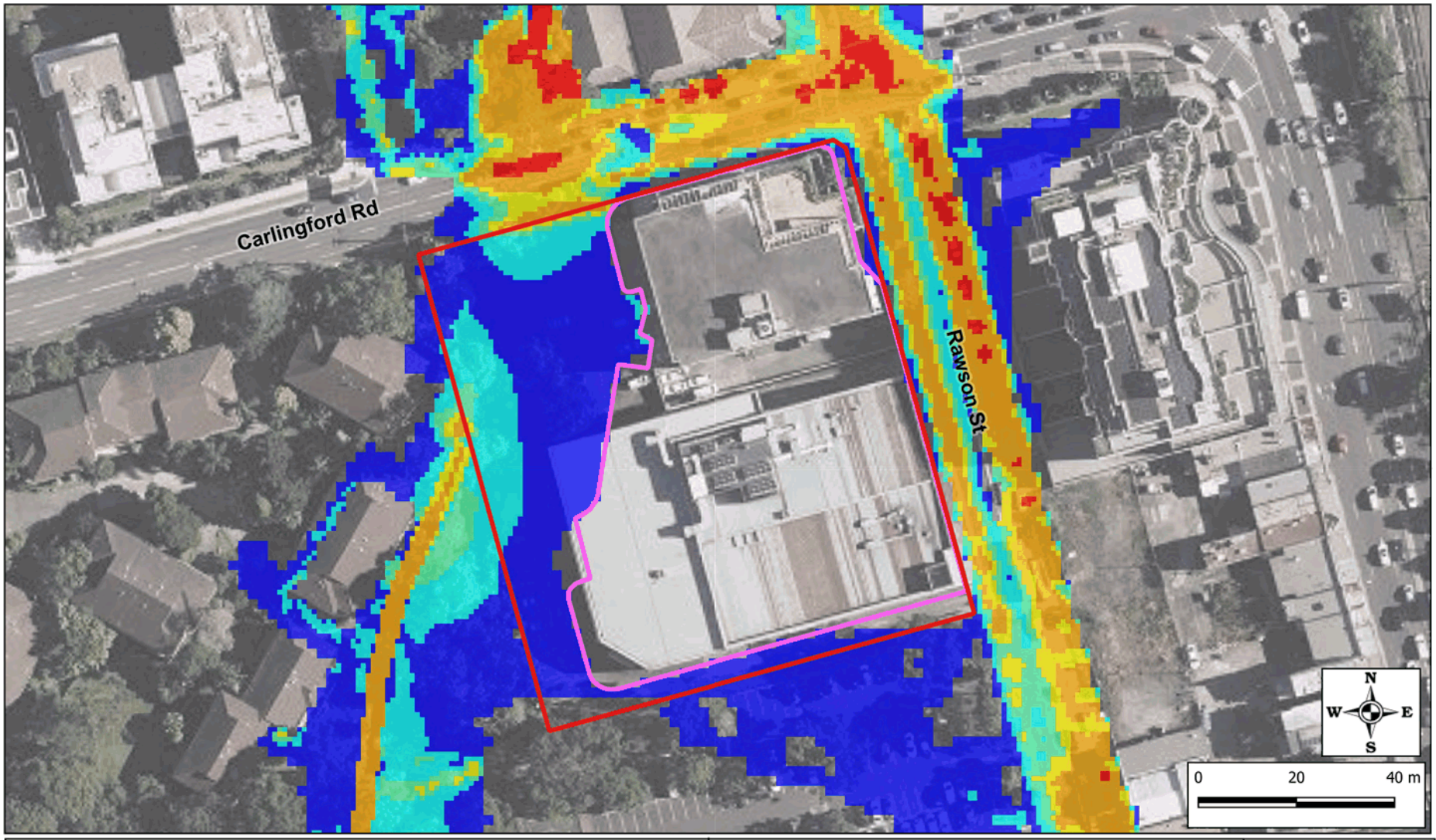
Flood Depths (m)
- 0.00 - 0.05
- 0.05 - 0.10
- 0.10 - 0.30
- 0.30 - 0.50
- 0.50 - 1.00
- > 1.00

Flood Level Conoturs (mAHD)
- Major (Spacing = 0.50 m)
- Minor (Spacing = 0.10 m)
- Subject Site
- Site's Buildings
- Cadastral Boundaries

Water Level Sample Points

TITLE:	**PMF 25% Blockage - Peak Depths and Levels (Post Development)**		
PROJECT:	**Epping Town Centre**		
PROJECT No.	**210046**		
DATE:	**11-2023**	SCALE: 1:1,000	FIGURE No. **B04**

grc HYDRO



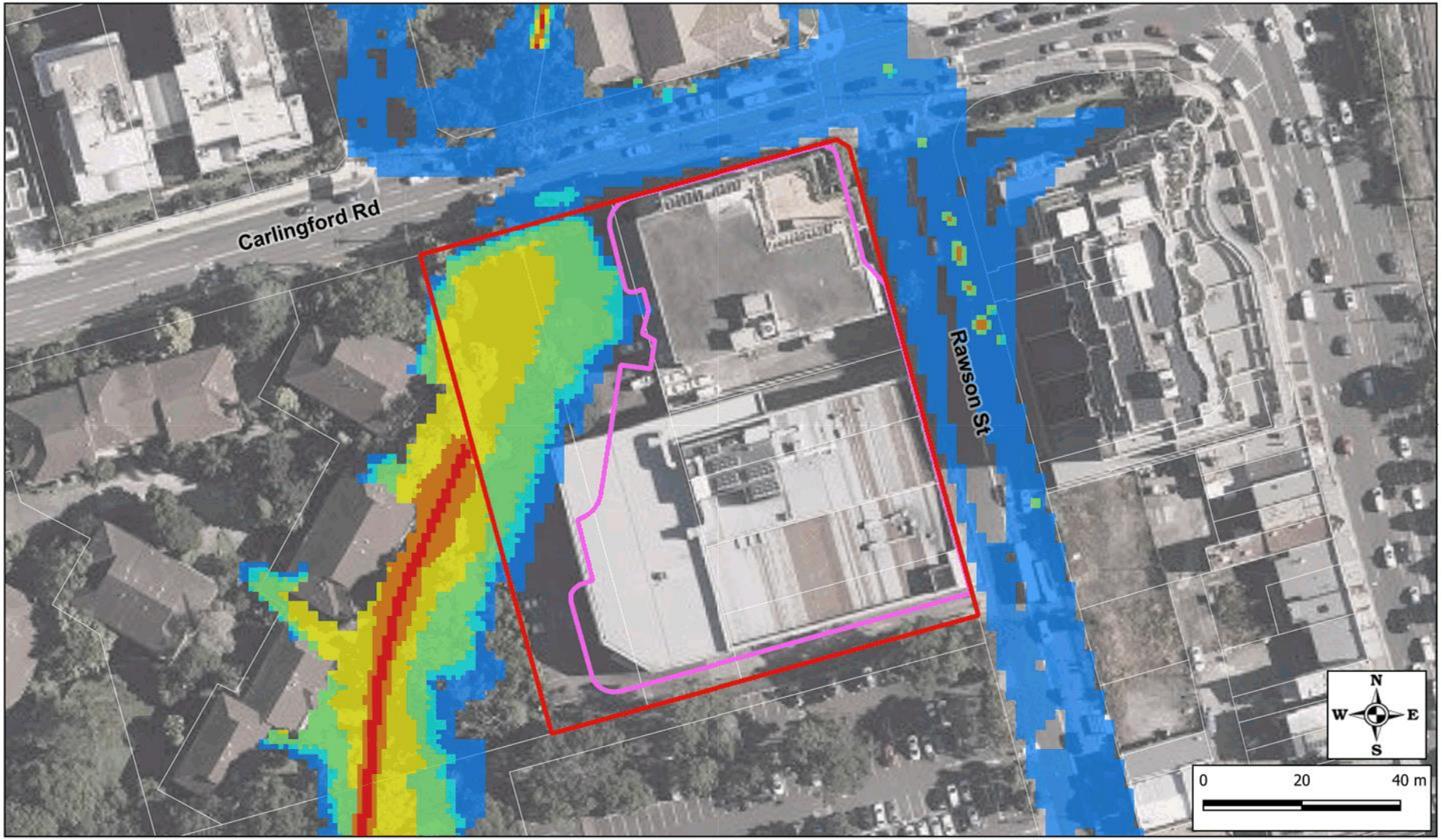
Flood Velocity (m/s)

- < 0.25
- 0.25 to 0.50
- 0.50 to 0.75
- 0.75 to 1.00
- 1.00 to 2.00
- > 2.00

- Subject Site
- Site's Buildings
- Cadastral Boundaries

TITLE:	**1% AEP 15% Blockage - Peak Velocities (Post Development)**		
PROJECT:	**Epping Town Centre**		
PROJECT No.	**210046**		
DATE: **11-2023**	SCALE: 1:1,000	FIGURE No. **B05**	

grc HYDRO



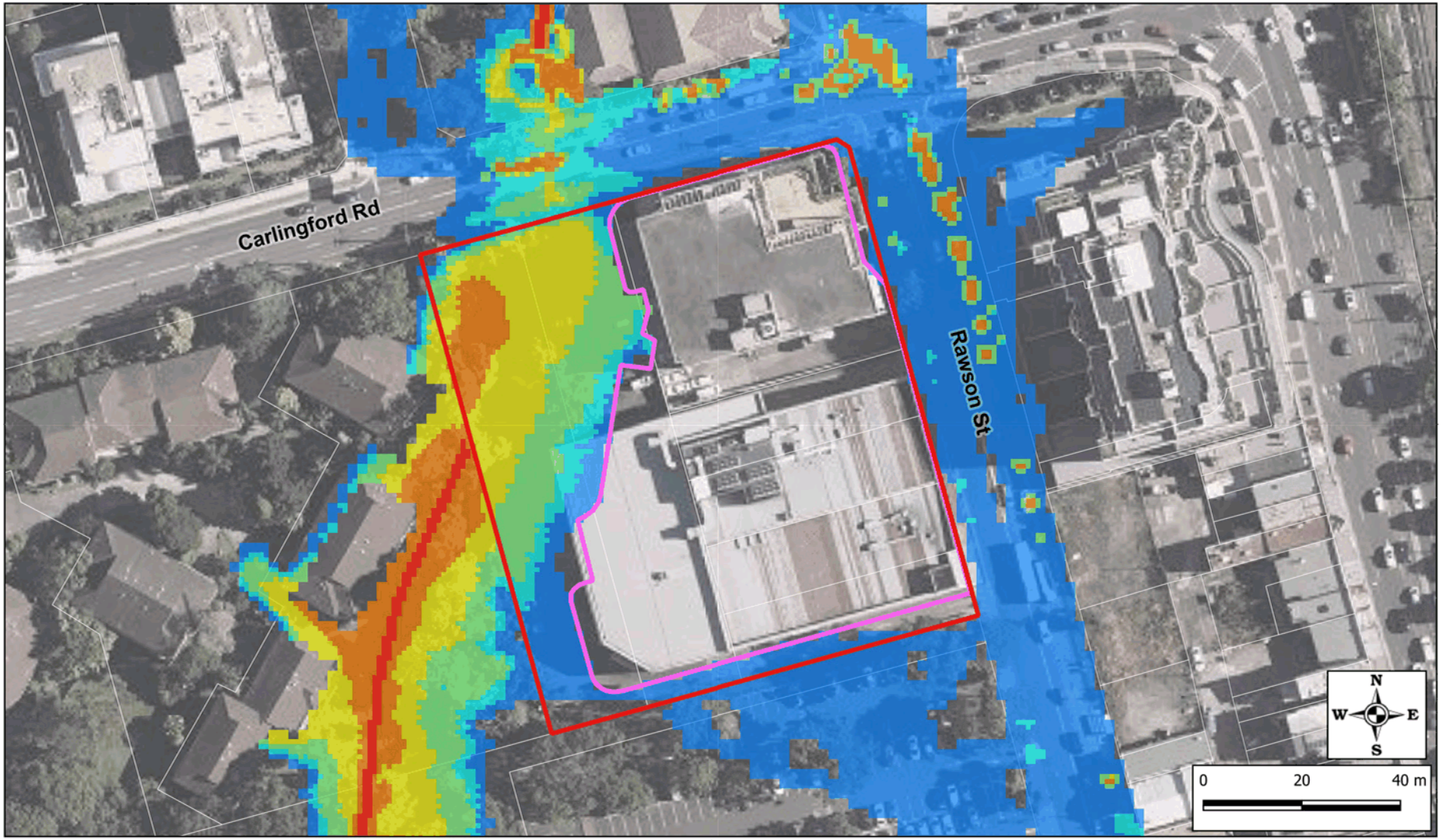
Flood Hazard

H1 H2 H3 H4 H5 H6

Subject Site
Site's Buildings
Cadastral Boundaries

TITLE:	**5% AEP 15% Blockage - Peak Flood Hazard (Post Development)**		
PROJECT:	**Epping Town Centre**		
PROJECT No.	**210046**		
DATE:	**11-2023**	SCALE: 1:1,000	FIGURE No. **B06**

grc HYDRO



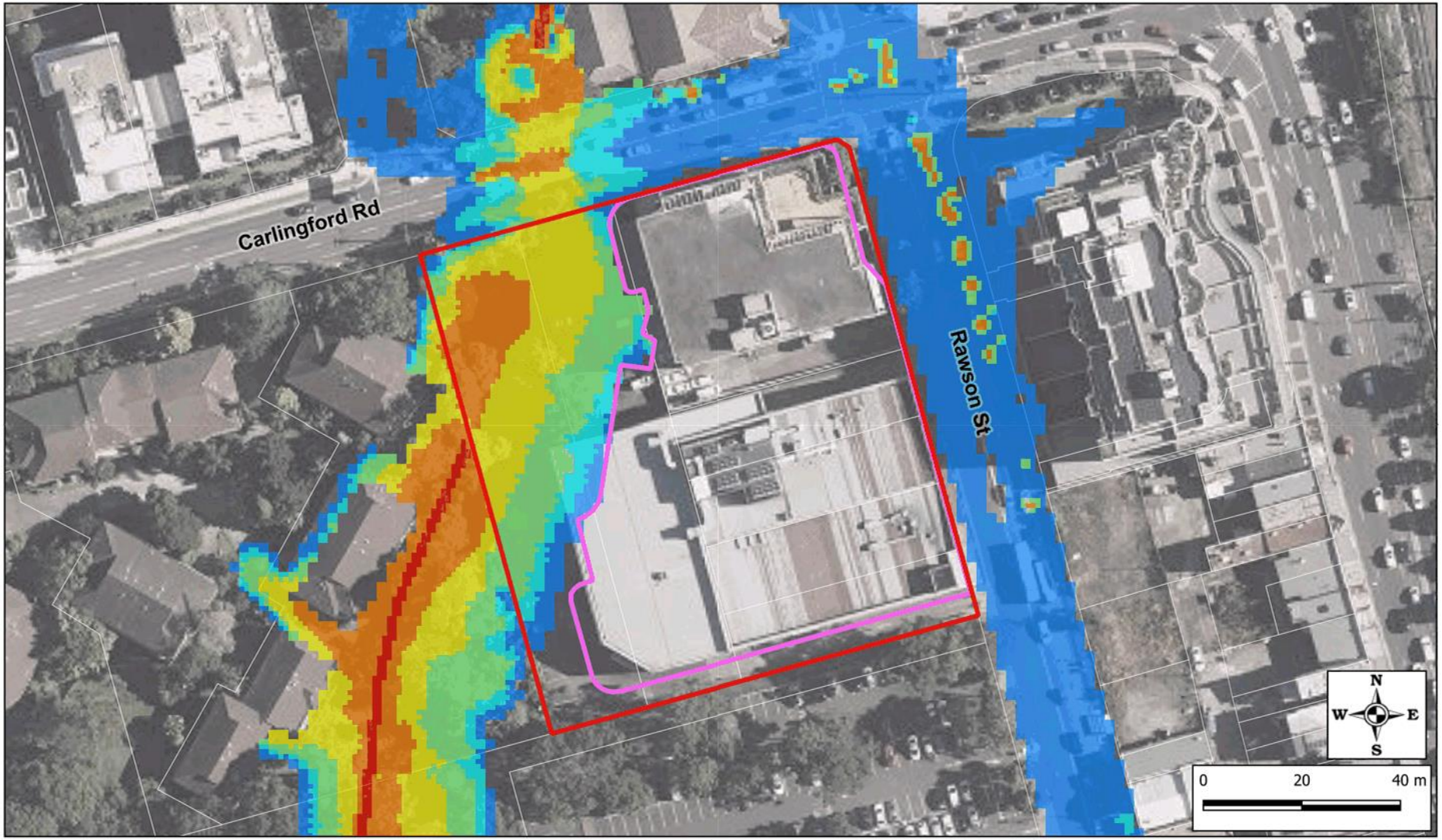
Flood Hazard

H1
H2
H3
H4
H5
H6

Subject Site
Site's Buildings
Cadastral Boundaries

TITLE:	**1% AEP 15% Blockage - Peak Flood Hazard (Post Development)**		
PROJECT:	**Epping Town Centre**		
PROJECT No.	**210046**		
DATE: **11-2023**	SCALE: 1:1,000	FIGURE No. **B07**	

grc HYDRO



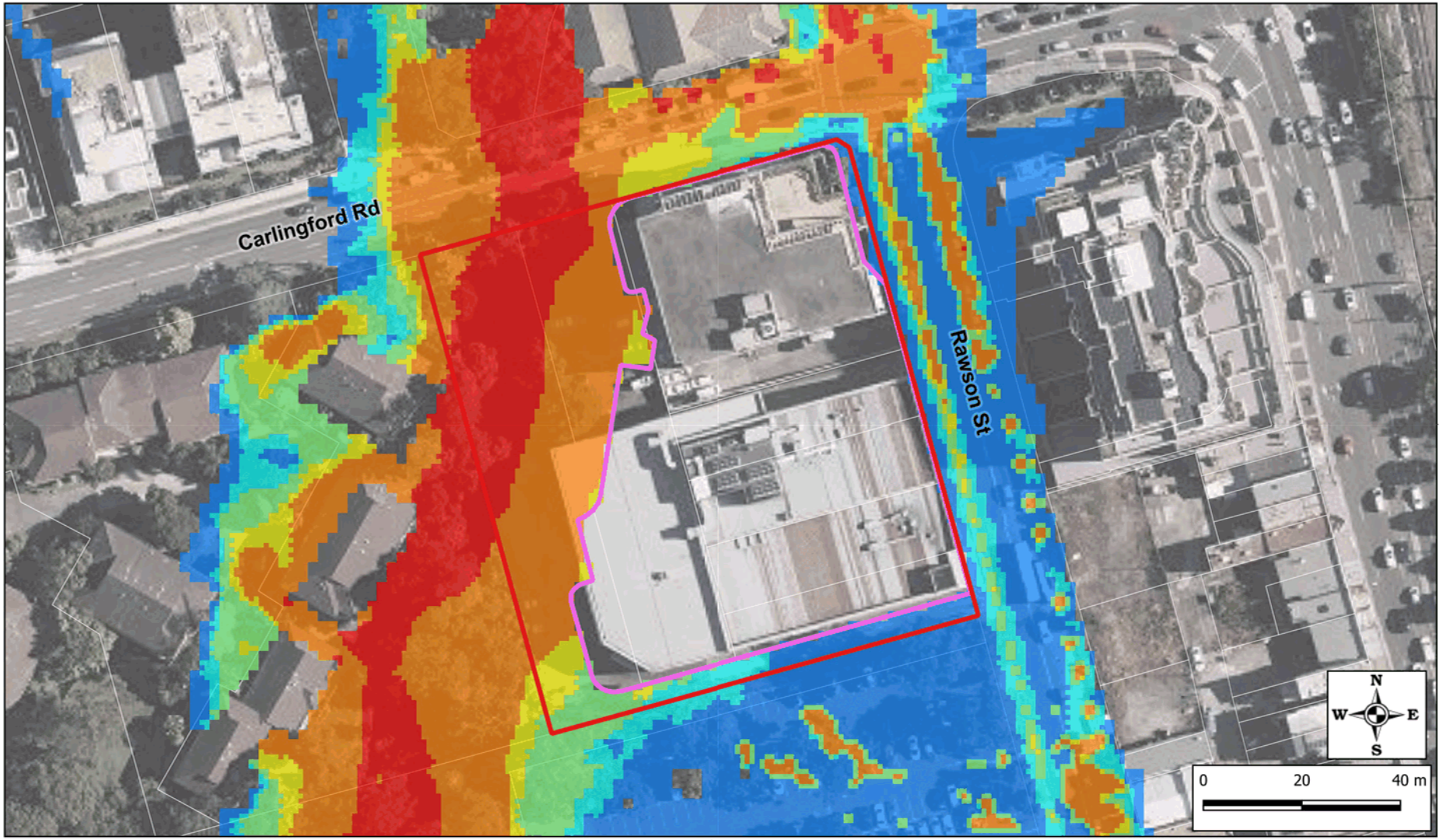
Flood Hazard

H1 H2 H3 H4 H5 H6

Subject Site
Site's Buildings
Cadastral Boundaries

TITLE:	**0.5% AEP 15% Blockage - Peak Flood Hazard (Post Development)**		
PROJECT:	**Epping Town Centre**		
PROJECT No.	**210046**		
DATE: **11-2023**	SCALE: 1:1,000	FIGURE No.	**B08**

grc HYDRO



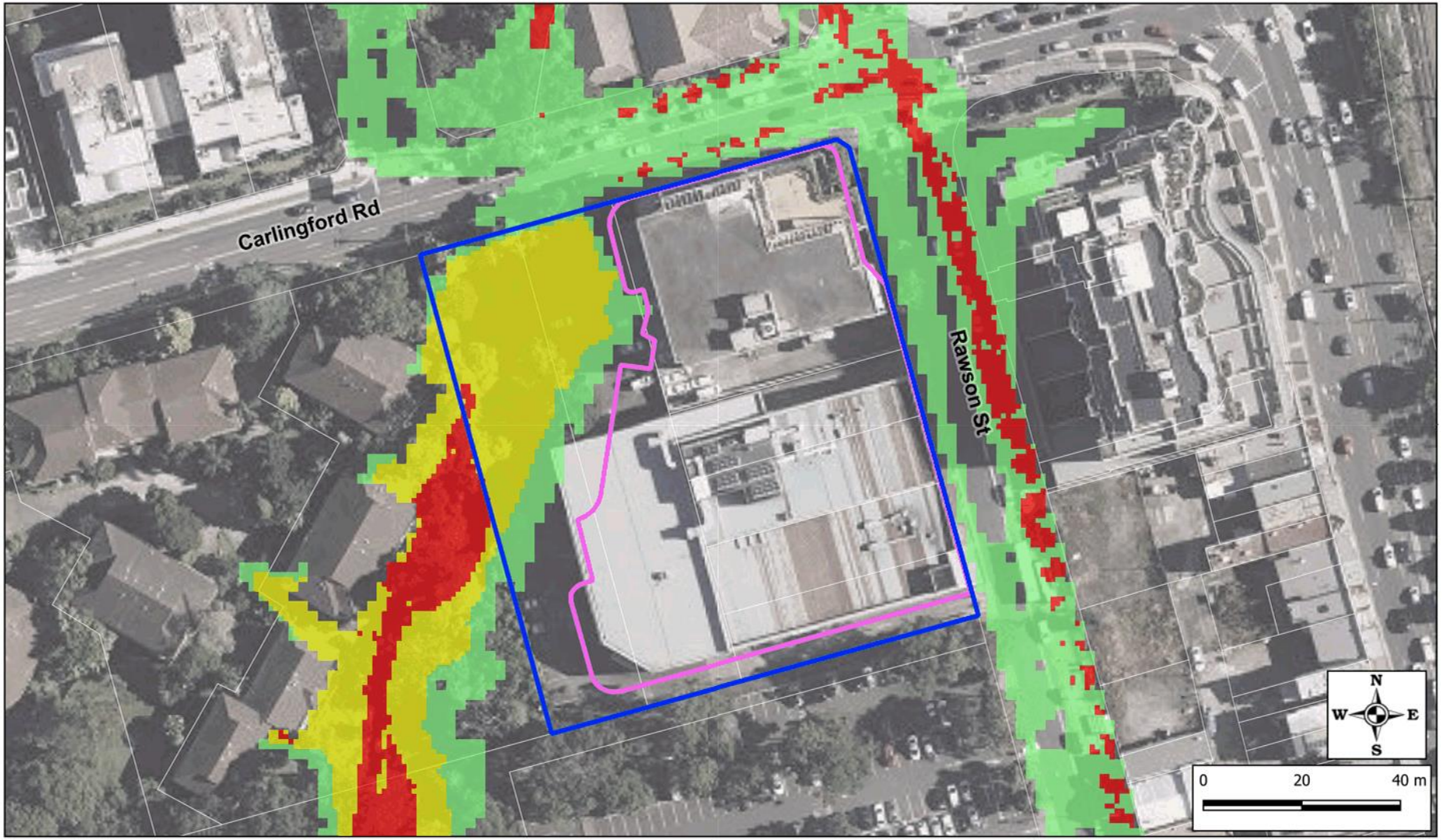
Flood Hazard

H1 H2 H3 H4 H5 H6

Subject Site
Site's Buildings
Cadastral Boundaries

TITLE:	**PMF 25% Blockage - Peak Flood Hazard (Post Development)**		
PROJECT:	**Epping Town Centre**		
PROJECT No.	**210046**		
DATE: **11-2023**	SCALE: 1:1,000	FIGURE No. **B09**	

grc HYDRO

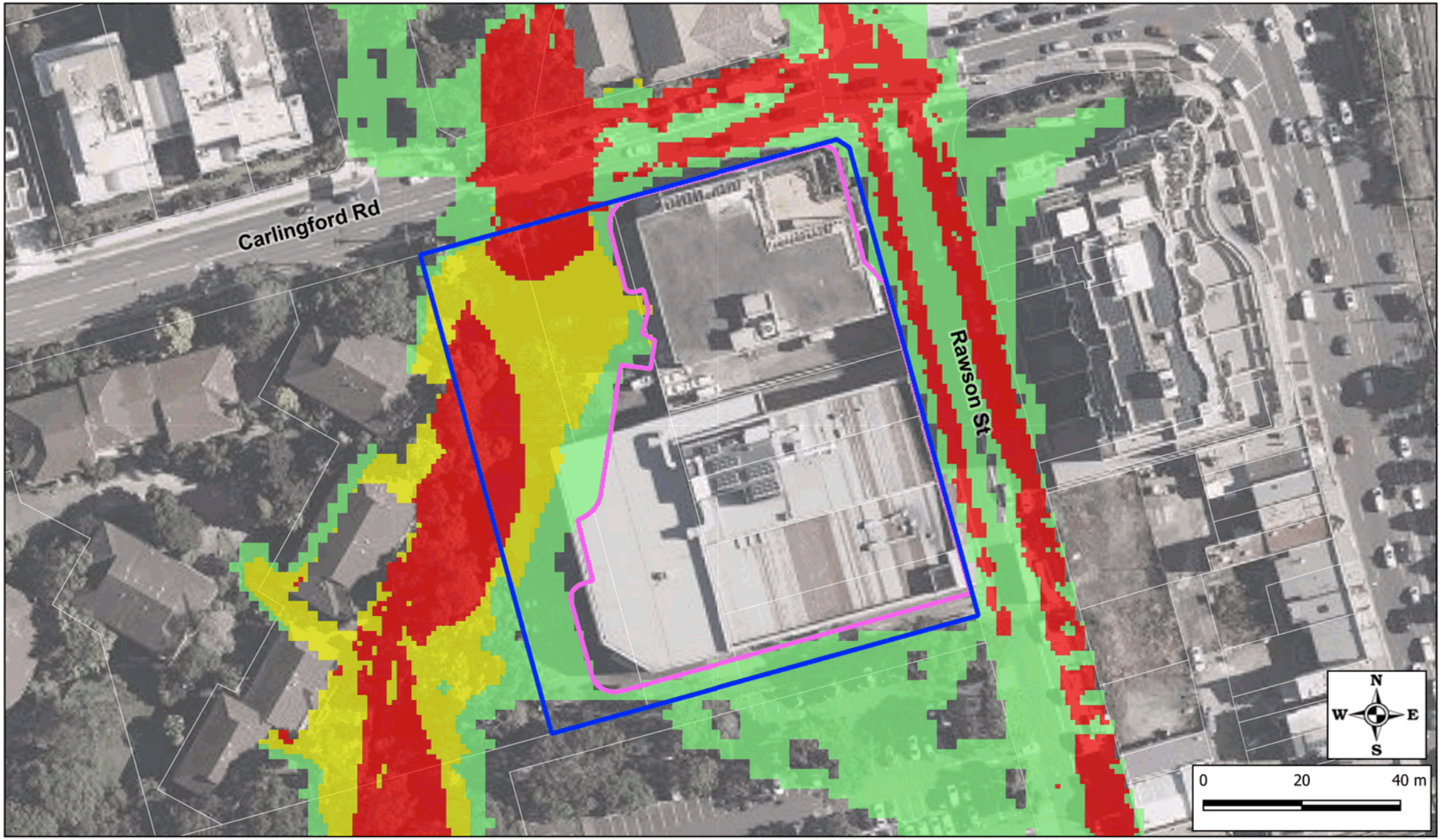


Flood Function
- Flow Conveyance
- Flood Storage
- Flood Fringe

- Subject Site
- Site's Buildings
- Cadastral Boundaries

TITLE:	**5% AEP 15% Blockage - Hydraulic Flood Function (Post Development)**		
PROJECT:	**Epping Town Centre**		
PROJECT No.	**210046**		
DATE: **11-2023**	SCALE: 1:1,000	FIGURE No. **B10**	

grc HYDRO

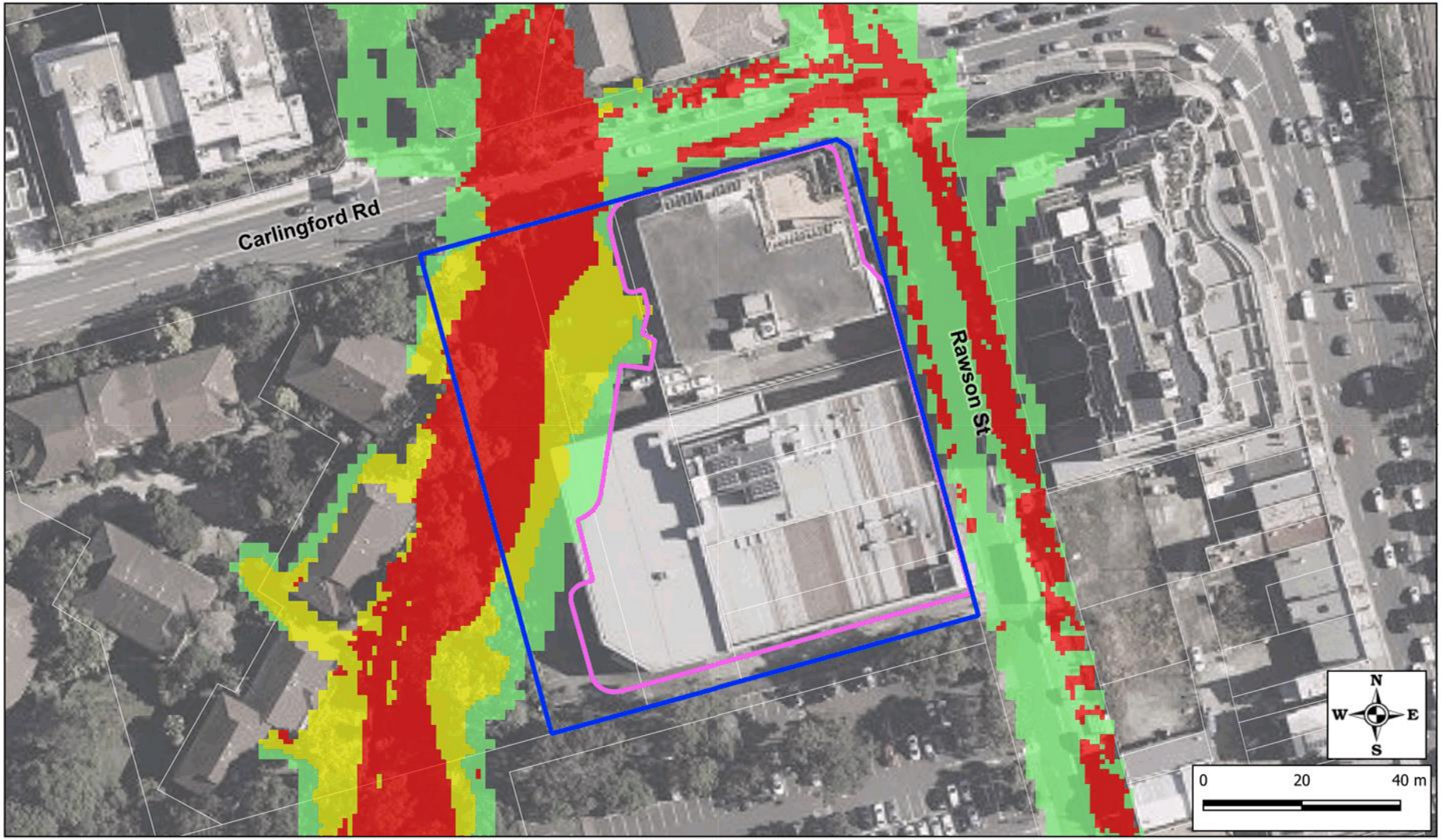


Flood Function
- Flow Conveyance
- Flood Storage
- Flood Fringe

- Subject Site
- Site's Buildings
- Cadastral Boundaries

TITLE:	**1% AEP 15% Blockage - Hydraulic Flood Function (Post Development)**		
PROJECT:	**Epping Town Centre**		
PROJECT No.	**210046**		
DATE: **11-2023**	SCALE: 1:1,000	FIGURE No. **B11**	

grc HYDRO



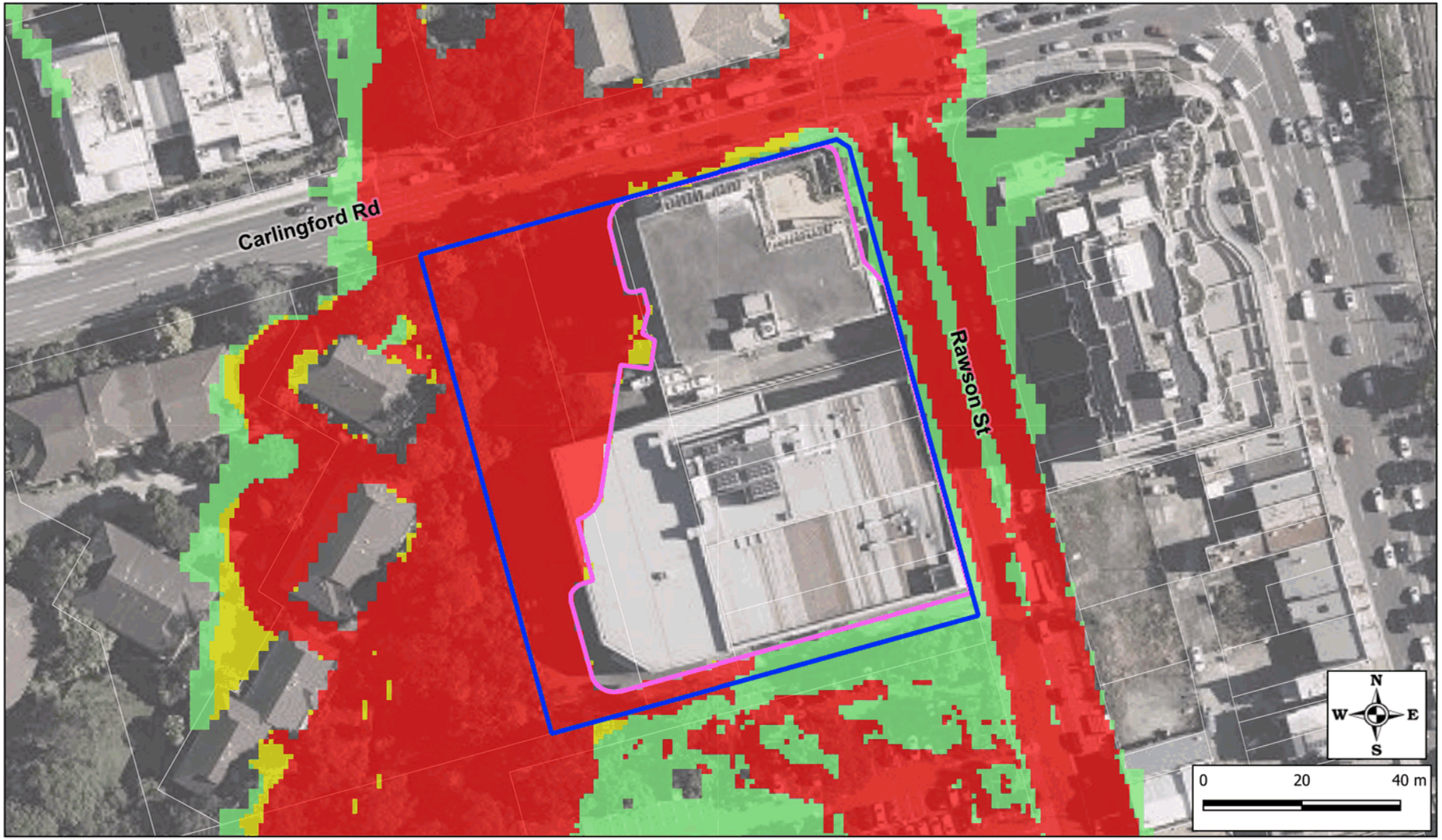
Flood Function

- Flow Conveyance
- Flood Storage
- Flood Fringe

- Subject Site
- Site's Buildings
- Cadastral Boundaries

TITLE:	**0.5% AEP 15% Blockage - Hydraulic Flood Function (Post Development)**		
PROJECT:	**Epping Town Centre**		
PROJECT No.	**210046**		
DATE: **11-2023**	SCALE: 1:1,000	FIGURE No.	**B12**

grc HYDRO

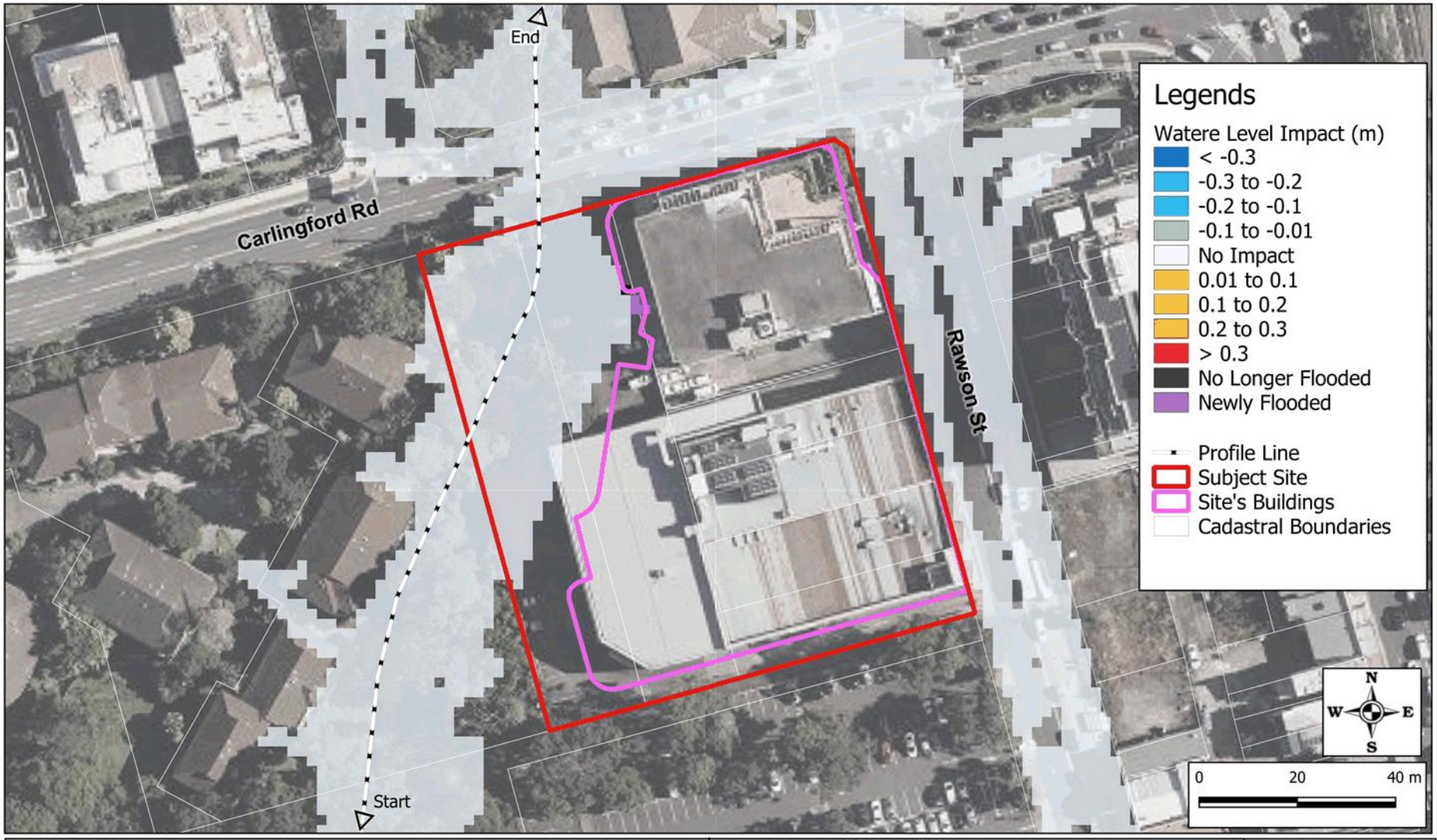


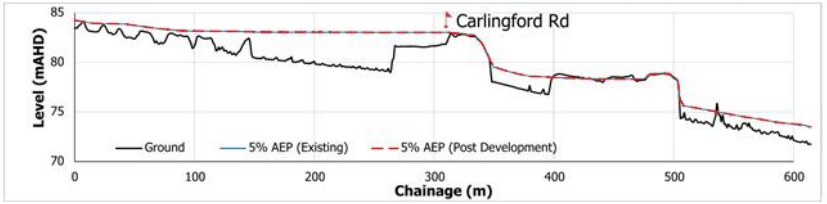
Flood Function
- Flow Conveyance
- Flood Storage
- Flood Fringe

- Subject Site
- Site's Buildings
- Cadastral Boundaries

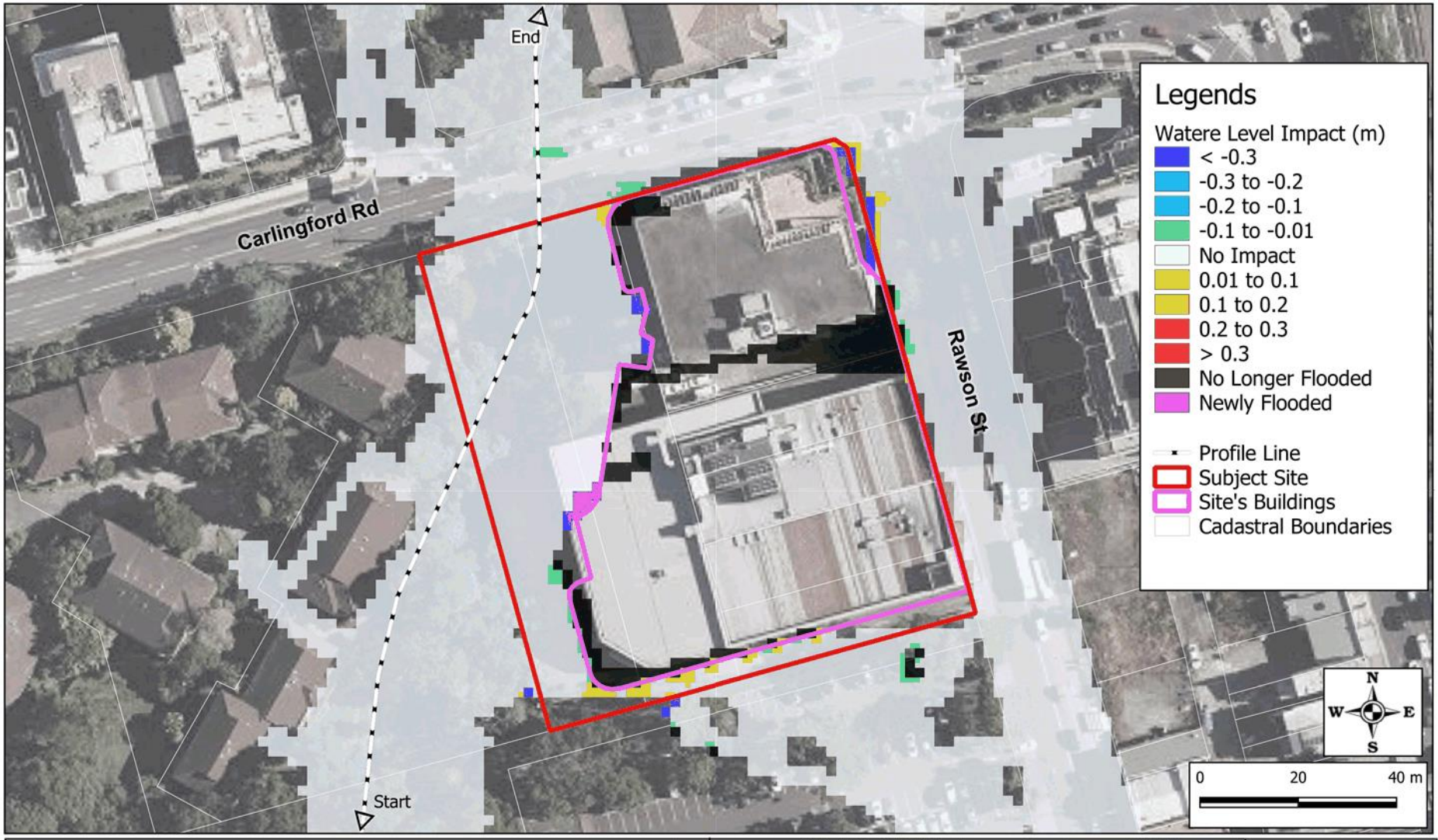
TITLE:	**PMF 25% Blockage - Hydraulic Flood Function (Post Development)**		
PROJECT:	**Epping Town Centre**		
PROJECT No.	**210046**		
DATE:	**11-2023**	SCALE: 1:1,000	FIGURE No. **B13**

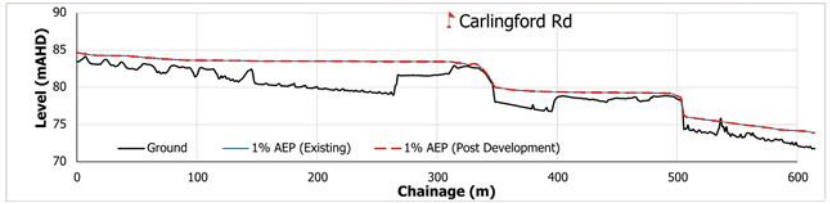
grc HYDRO



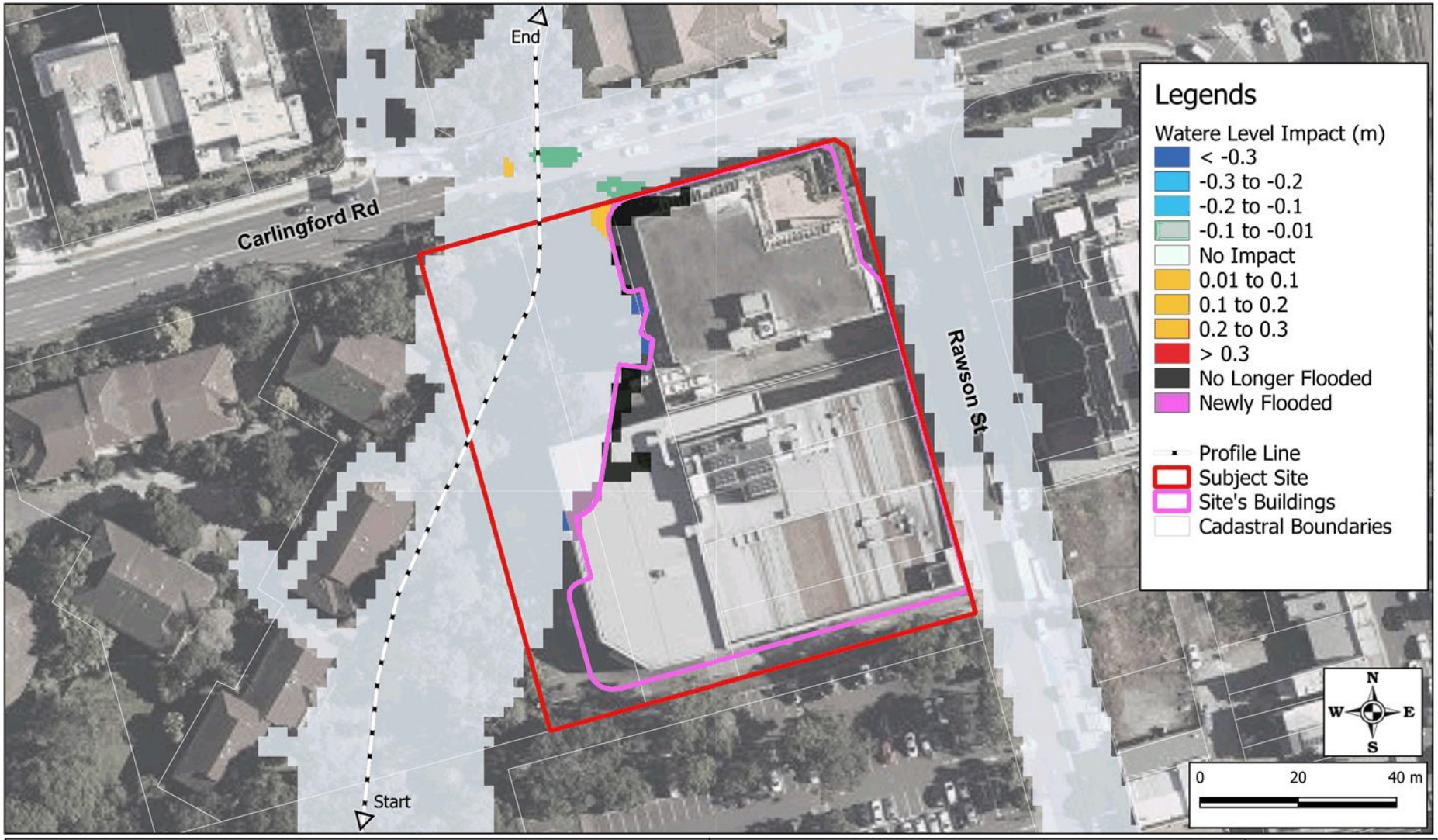


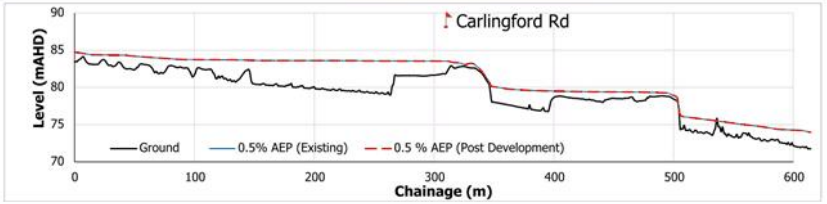
TITLE:	**5% AEP 15% Blockage - Development Water Levels Impact**		
PROJECT:	**Epping Town Centre**		
PROJECT No.	**210046**		
DATE: **11-2023**	SCALE: 1:1,000	FIGURE No. **C01**	



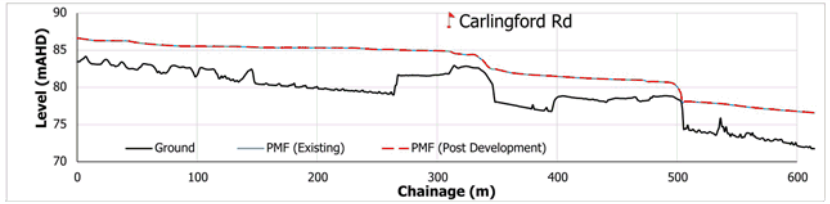


TITLE:	**1% AEP 15% Blockage - Development Water Levels Impact**		
PROJECT:	**Epping Town Centre**		
PROJECT No.	**210046**		
DATE: **11-2023**	SCALE: 1:1,000	FIGURE No.	**C02**

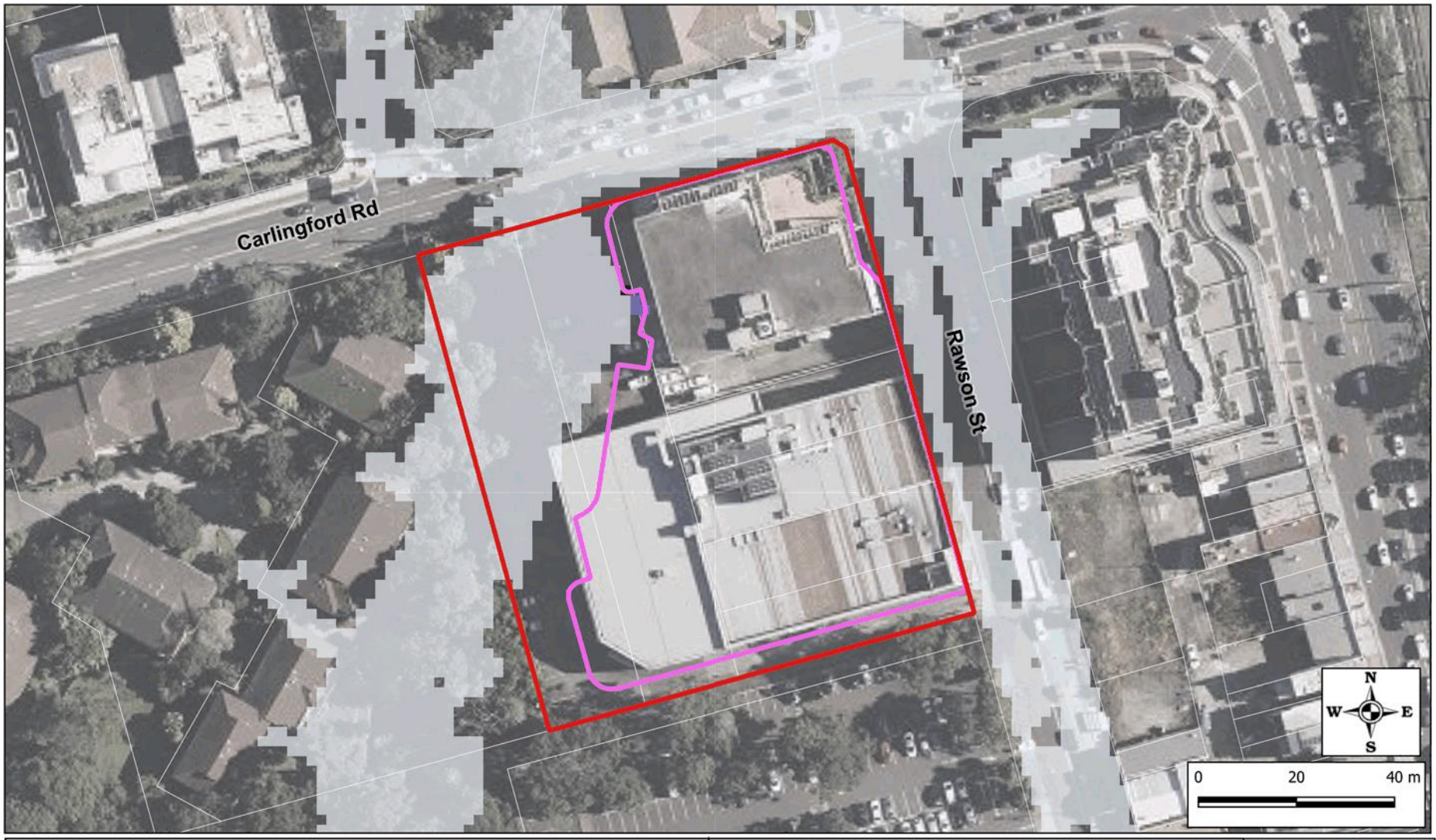


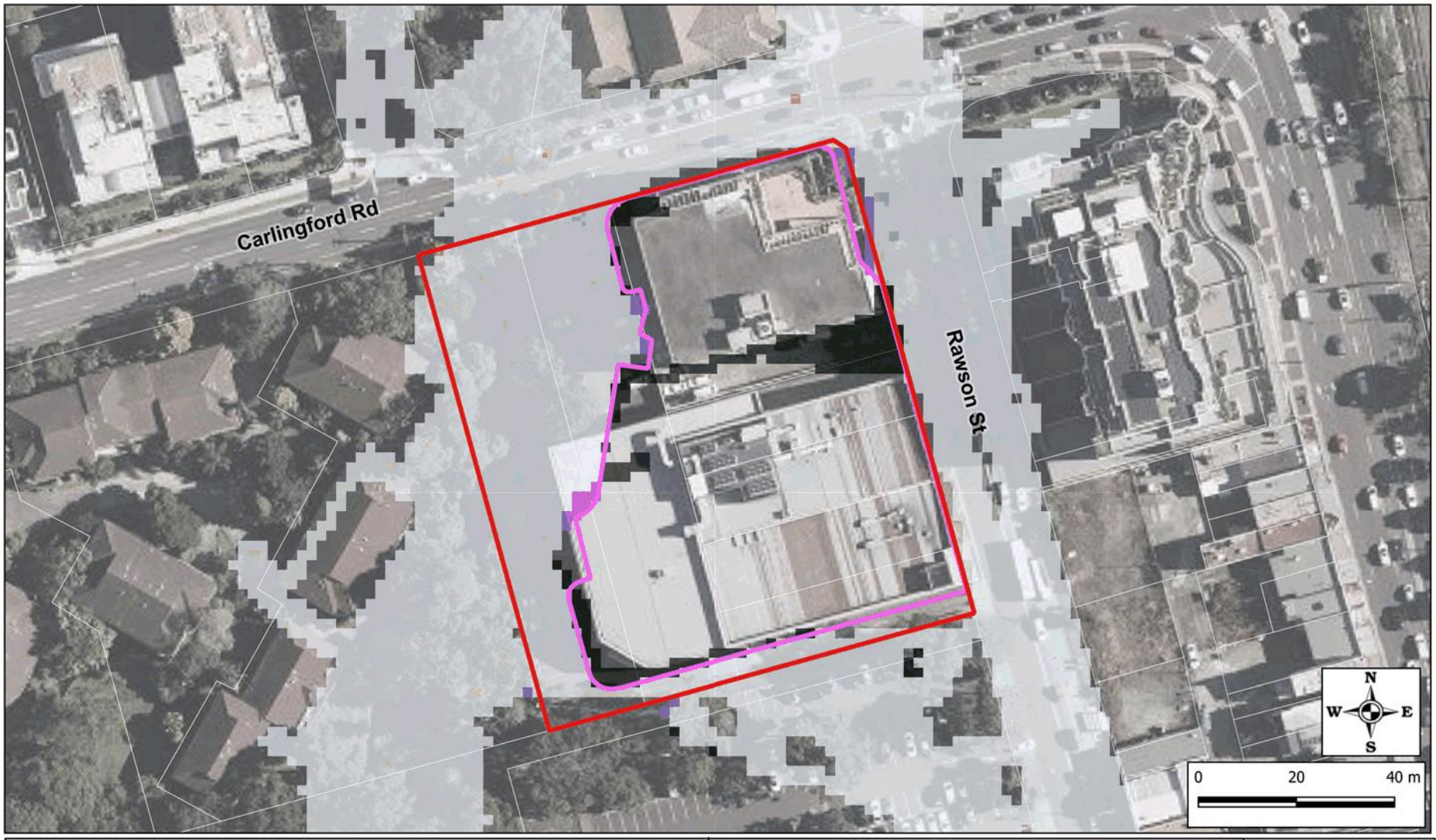


TITLE:	**0.5% AEP 15% Blockage - Development Water Levels Impact**		
PROJECT:	**Epping Town Centre**		
PROJECT No.	**210046**		
DATE: **11-2023**	SCALE: 1:1,000	FIGURE No. **C03**	



TITLE:	**PMF 25% Blockage - Development Water Levels Impact**		
PROJECT:	**Epping Town Centre**		
PROJECT No.	**210046**		
DATE: **11-2023**	SCALE: 1:1,000	FIGURE No. **C04**	


Carlingford Rd
Rawson St
N
W
E
S
0
20
40 m
Flood Hazard Impact
-5 (H6 to H1)
-4
-3
-2
-1
No change
+1
+2
+3
+4
+5 (H1 to H6)
Hazard Removed
Hazard Introduced
Subject Site
Site's Buildings
Cadastral Boundaries
TITLE: 5% AEP 15% Blockage - Development Hazard Impact
PROJECT: Epping Town Centre
PROJECT No. 210046
DATE: 11-2023
SCALE: 1:1,000
FIGURE No. C05
grc HYDRO

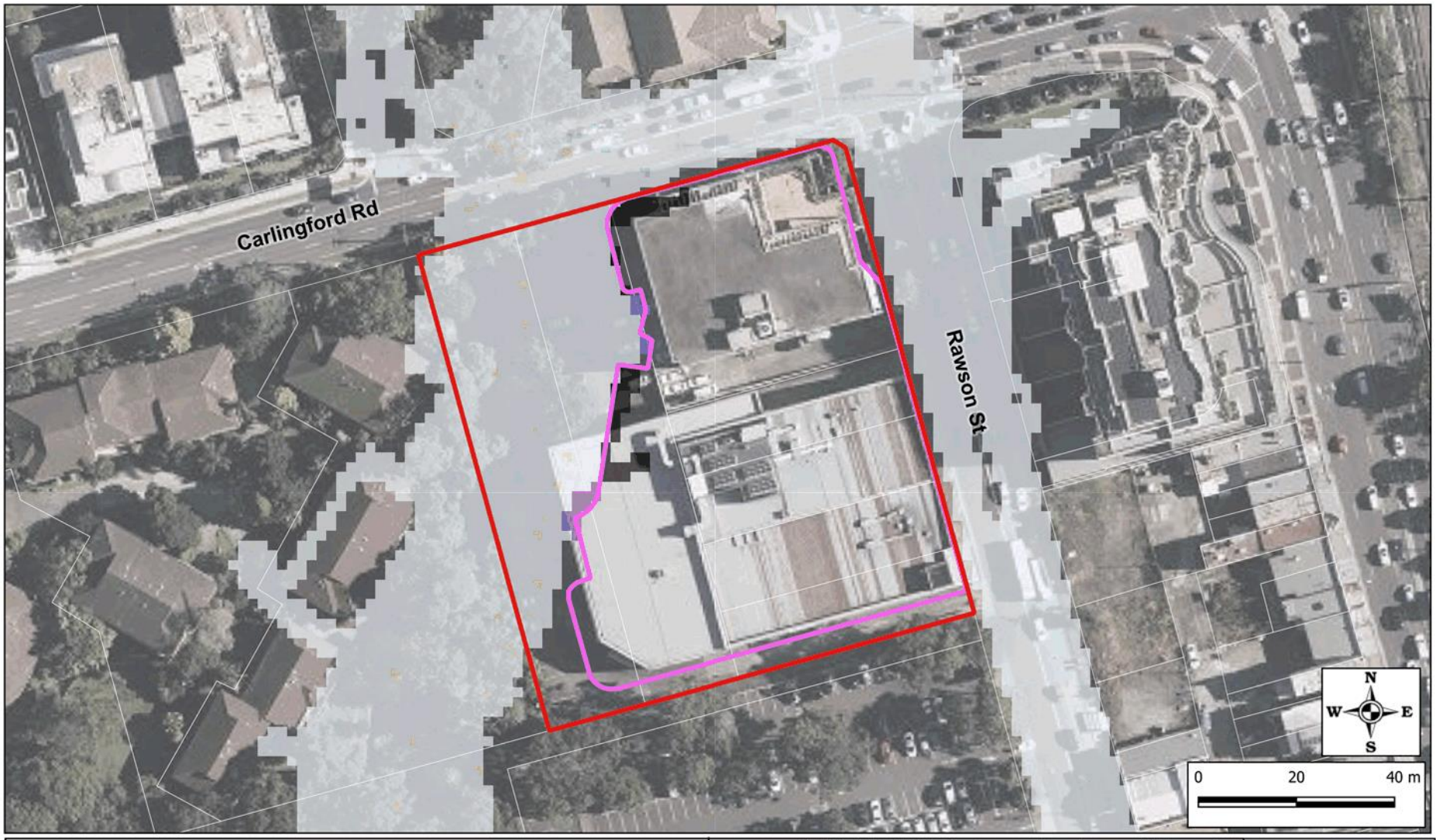


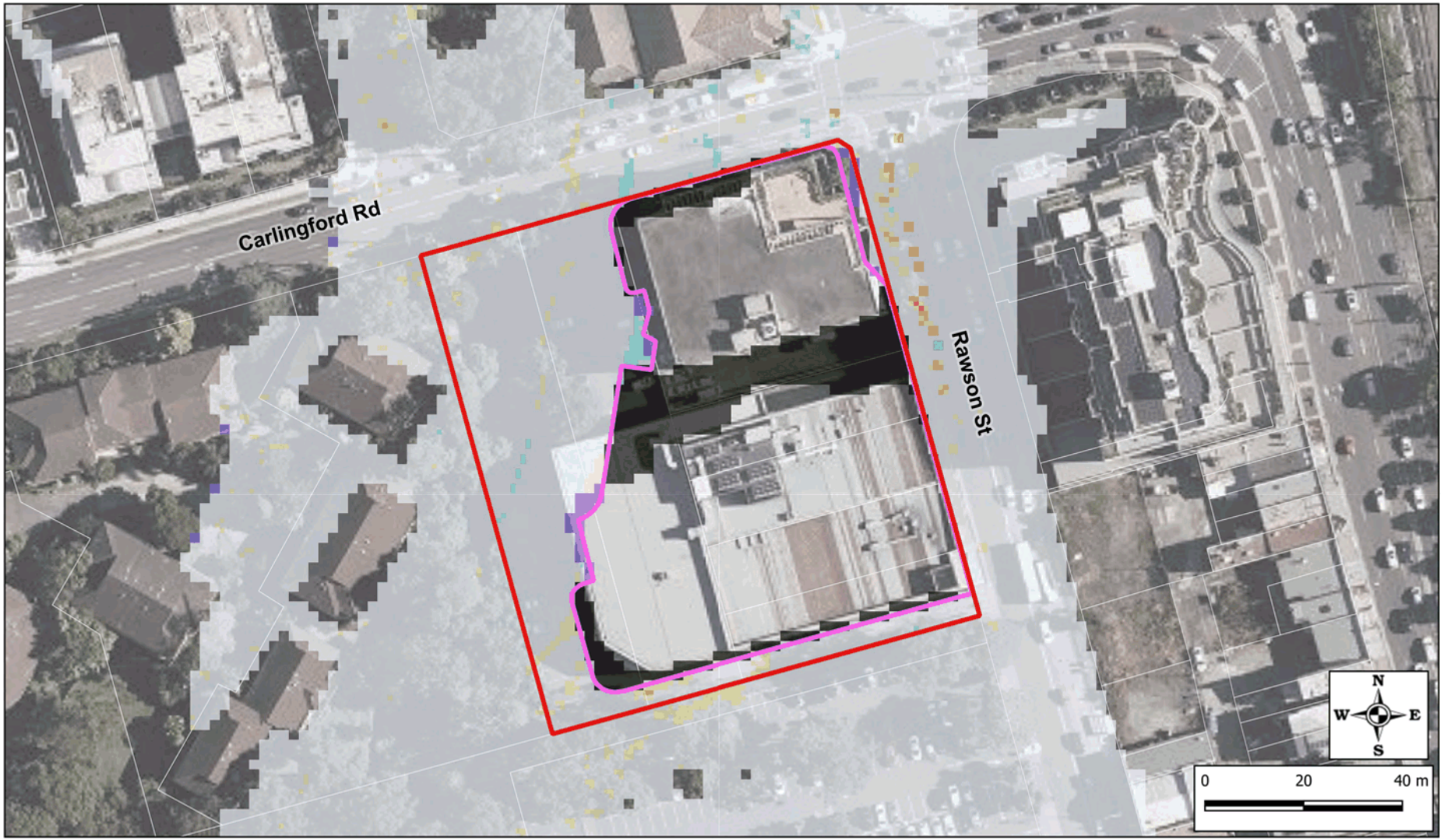
Flood Hazard Impact

-5 (H6 to H1)
-4
-3
-2
-1
No change
+1
+2
+3
+4
+5 (H1 to H6)
Hazard Removed
Hazard Introduced
Subject Site
Site's Buildings
Cadastral Boundaries

TITLE:	**1% AEP 15% Blockage - Development Hazard Impact**		
PROJECT:	**Epping Town Centre**		
PROJECT No.	**210046**		
DATE: **11-2023**	SCALE: 1:1,000	FIGURE No. **C06**	

grc HYDRO


Carlingford Rd
Rawson St
N
W
E
S
0
20
40 m
Flood Hazard Impact
-5 (H6 to H1)
-4
-3
-2
-1
No change
+1
+2
+3
+4
+5 (H1 to H6)
Hazard Removed
Hazard Introduced
Subject Site
Site's Buildings
Cadastral Boundaries
TITLE: 0.5% AEP 15% Blockage - Development Hazard Impact
PROJECT: Epping Town Centre
PROJECT No. 210046
DATE: 11-2023
SCALE: 1:1,000
FIGURE No. C07
grc HYDRO

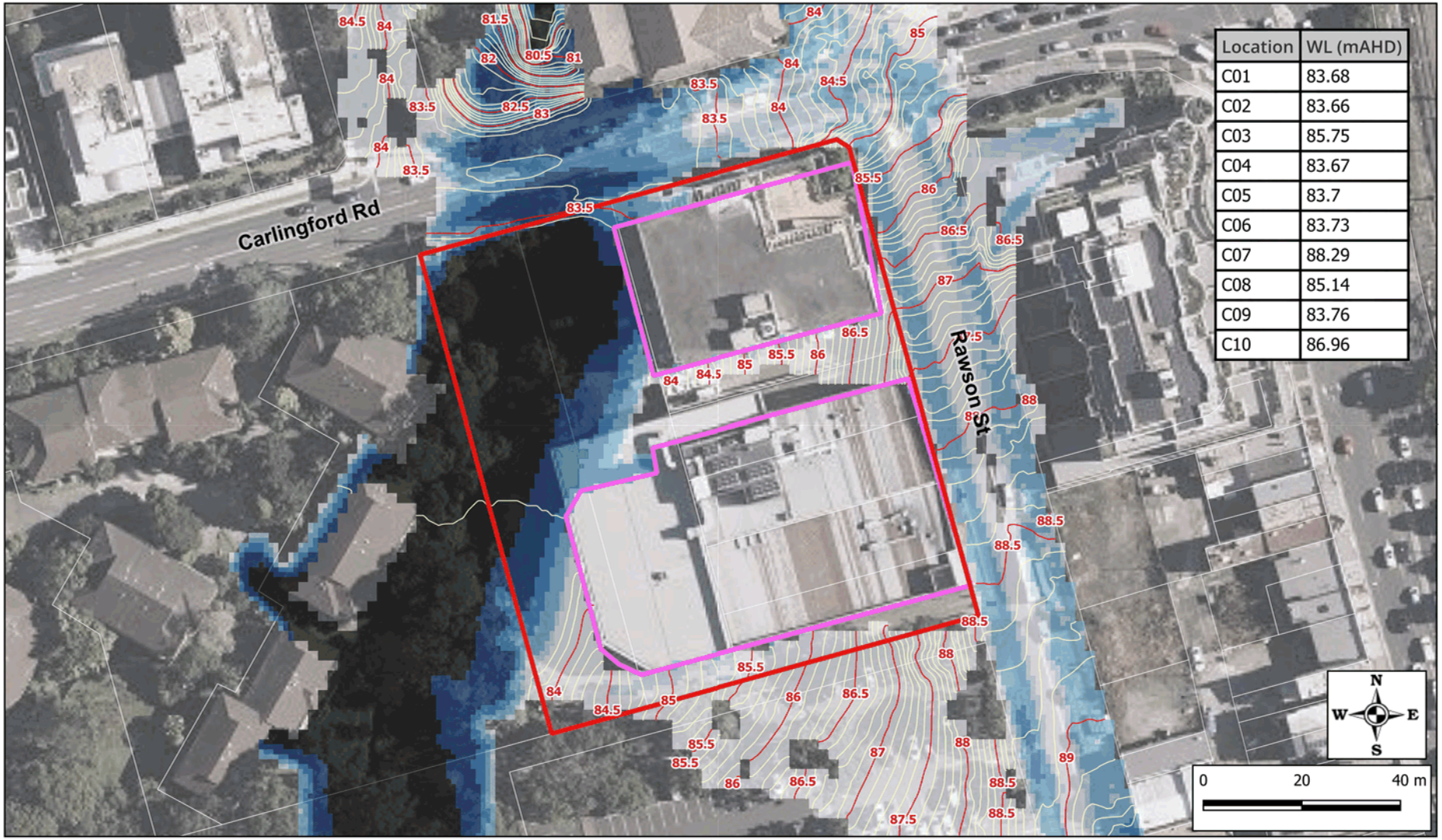


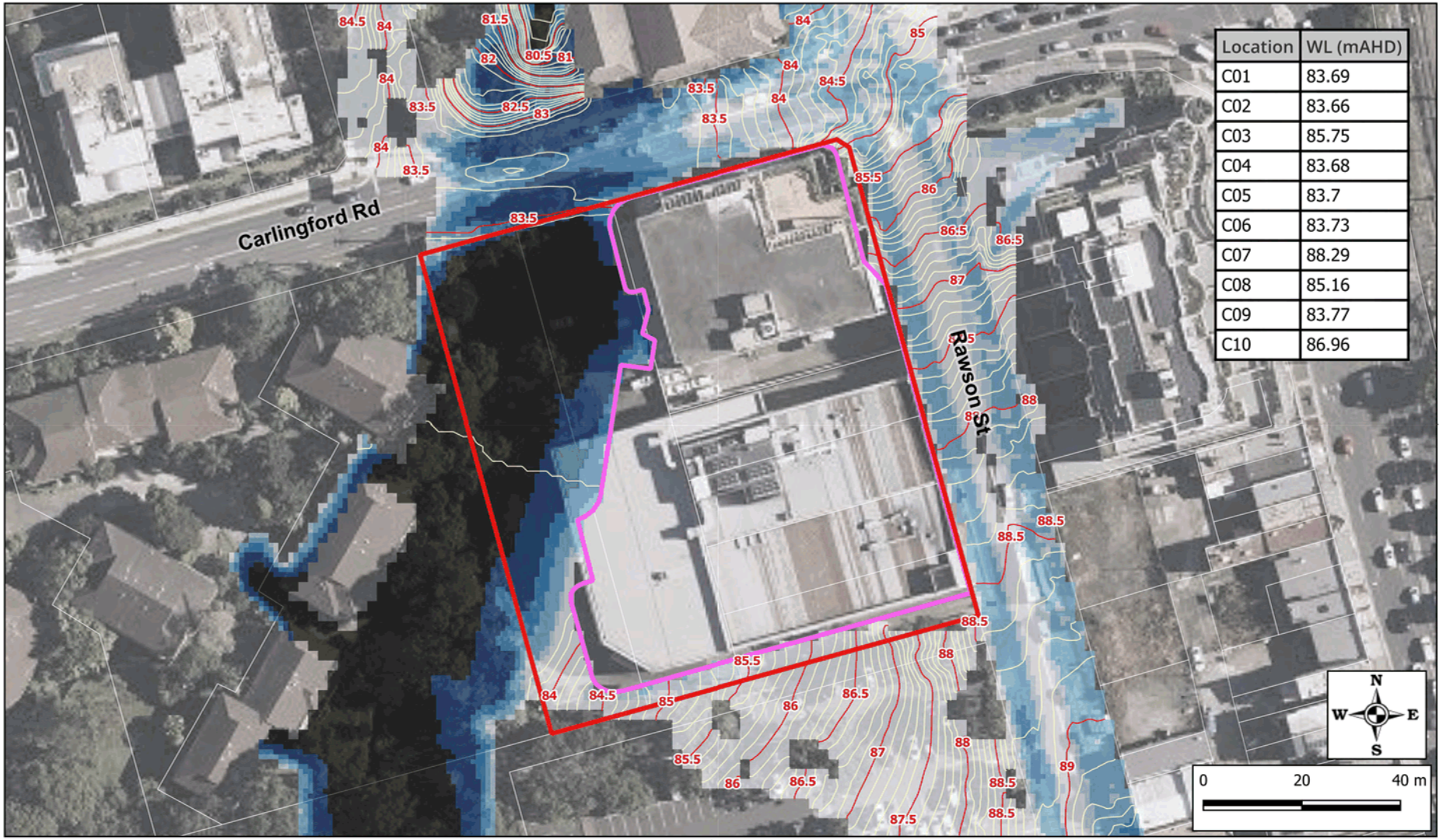
Flood Hazard Impact

-5 (H6 to H1)
-4
-3
-2
-1
No change
+1
+2
+3
+4
+5 (H1 to H6)
Hazard Removed
Hazard Introduced
Subject Site
Site's Buildings
Cadastral Boundaries

TITLE:	**PMF 25% Blockage - Development Hazard Impact**		
PROJECT:	**Epping Town Centre**		
PROJECT No.	**210046**		
DATE: **11-2023**	SCALE: 1:1,000	FIGURE No. **C08**	

grc HYDRO


Carlingford Rd
Rawson St
Location | WL (mAHD)
C01 | 83.68
C02 | 83.66
C03 | 85.75
C04 | 83.67
C05 | 83.7
C06 | 83.73
C07 | 88.29
C08 | 85.14
C09 | 83.76
C10 | 86.96
N
W
E
S
0
20
40 m
Flood Depths (m)
0.00 - 0.05
0.05 - 0.10
0.10 - 0.30
0.30 - 0.50
0.50 - 1.00
> 1.00
Flood Level Conoturs (mAHD)
Major (Spacing = 0.50 m)
Minor (Spacing = 0.10 m)
Subject Site
Site's Buildings
Cadastral Boundaries
Water Level Sample Points
TITLE: 1% AEP for RCP8.5 2090 Climate Change - Peak Depths and Levels (Existing)
PROJECT: Epping Town Centre
PROJECT No. 210046
DATE: 11-2023
SCALE: 1:1,000
FIGURE No. D01
grc HYDRO


Carlingford Rd
Rawson St
Location | WL (mAHD)
C01 | 83.69
C02 | 83.66
C03 | 85.75
C04 | 83.68
C05 | 83.7
C06 | 83.73
C07 | 88.29
C08 | 85.16
C09 | 83.77
C10 | 86.96
N
W
E
S
0
20
40 m
Flood Depths (m)
0.00 - 0.05
0.05 - 0.10
0.10 - 0.30
0.30 - 0.50
0.50 - 1.00
> 1.00
Flood Level Conoturs (mAHD)
Major (Spacing = 0.50 m)
Minor (Spacing = 0.10 m)
Subject Site
Site's Buildings
Cadastral Boundaries
Water Level Sample Points
TITLE: 1% AEP for RCP8.5 2090 Climate Change - Peak Depths and Levels (Post Development)
PROJECT: Epping Town Centre
PROJECT No. 210046
DATE: 11-2023
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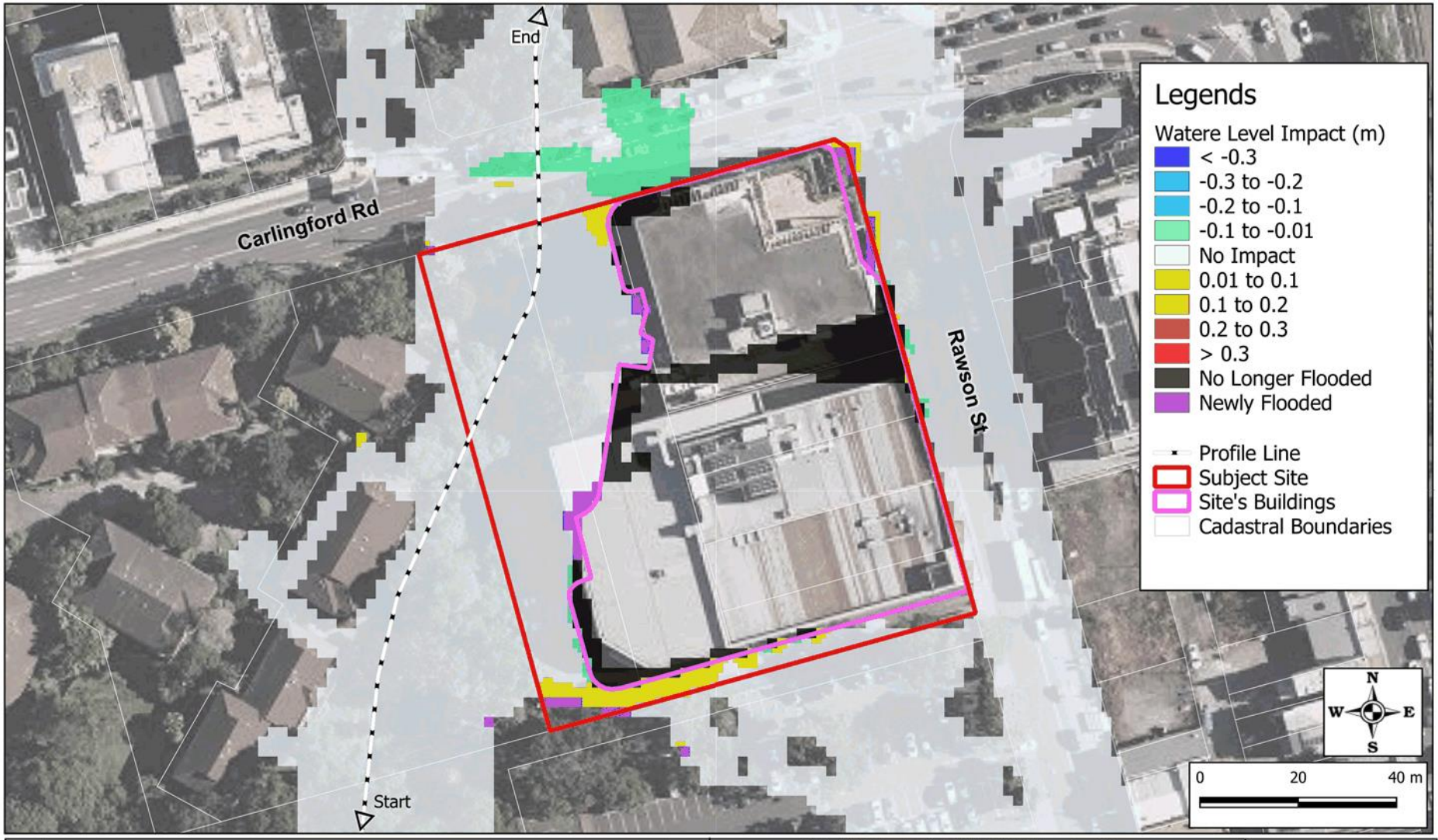

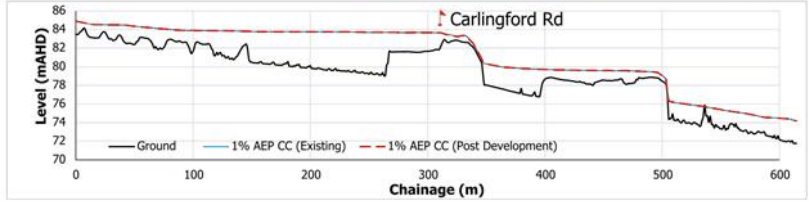

TITLE:	**1% AEP for RCP8.5 2090 Climate Change - Development Water Levels Impact**		
PROJECT:	**Epping Town Centre**		
PROJECT No.	**210046**		
DATE: **11-2023**	SCALE: 1:1,000	FIGURE No. **D03**	

Stantec

53-61 RAWSON STREET, EPPING

Transport Impact Assessment

Prepared for: Canjs Pty Ltd

Ref: 301400281 | Date: 1 May 2024

Revision

Revision	Date	Comment	Prepared By	Reviewed By	Approved By
A	24 August 2023	Final	William Xie, Ingrid Bissaker	Ingrid Bissaker, Chris Wilson	Chris Wilson
B	29 April 2024	Final	William Xie, Sunny Hong	Sunny Hong, Chris Wilson	Chris Wilson
C	1 May 2024	Final	William Xie, Sunny Hong	Sunny Hong, Chris Wilson	Chris Wilson

Chris Wilson

For and on behalf of

Stantec Australia Pty Ltd

L9, 203 Pacific Highway, St Leonards NSW 2065

Acknowledgment of Country

In the spirit of reconciliation, Stantec acknowledges the Traditional Custodians of country throughout Australia and their connections to land, sea and community. We pay our respect to their Elders past and present, and extend that respect to all Aboriginal and Torres Strait Islander peoples.

Limitations

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Executive Summary

A Planning Proposal has been lodged with Parramatta City Council (Council) to amend the current planning controls for the current site located at 53-61 Rawson Street, Epping. The Proposal seeks to amend the planning controls in the Parramatta Local Environment Plan (LEP) 2023 to permit mixed-use development on land currently zoned E1 (Local Centre)[1] and increase the maximum floor space ratio and height controls that currently apply to the site. The indicative development yield is around 420 apartments and around 13,700 square metres of non-residential uses.

This report has been prepared as an update to the August 2023 report and in addition to the RFI response provided on 19 February 2024, to reflect the revised planning proposal responding to Council's RFI of December 2023 and including the additional non-residential floor space of 0.5:1. The August 2023 report and RFI response letter, provided on 19 February 2024, assessed a development yield of around 420 apartments and 9,100 square metres of non-residential uses.

A comparison between the previous development yield and the updated development yield is summarised at the end of this executive summary.

A key strategic merit of the development is the opportunity to promote sustainable travel given the high-density mixed-use nature of the development within a strategic centre; and within 200 metres of a rail interchange that provides convenient access to local and regional residential, commuter, retail and recreational centres.

The design currently allows for a single consolidated driveway along the southern boundary of the site at Rawson Street aligned with the DCP 2011 service lane. In accordance with DCP 2011, the service lane could be extended along the western boundary of the site to Carlingford Road. As confirmed by the Flood Assessment Report prepared by GRC Hydro dated June 2023, the service lane is subject to flooding events and hence is not recommended for use by general vehicles. Notwithstanding, it is recommended the service lane is open for use by service vehicles to remove service vehicles from Rawson Street and separate these movements from general vehicles accessing the basement car park and pedestrians travelling along Rawson Street, with controls in place to close the service lane during flooding events.

The proposal incorporates around 548 parking spaces over five basement levels. The car park will provide parking for residents, staff and visitors with access control (roller doors/ boom gates) to ensure secure access and separation of users.

The proposed development could be expected to generate in the order of 309 and 559 vehicle trips respectively in the AM and PM peak hours (including service vehicle trips). When considering that 25 per cent of retail traffic is passing trade and hence while they are included in the total generation, they are not "new" trips on the road network, the development results in 273 and 450 "new" vehicle trips respectively in the AM and PM peak hours.

The proposed traffic anticipated to travel through the key surrounding intersections is expected to be minor, contributing up to three per cent additional traffic compared to existing traffic volumes.

The proposed site will have a net increase in vehicle generation of around 132 and 138 new vehicle trips respectively in the AM and PM peak hours compared to existing land uses on site. For the purpose of modelling the traffic impact of the development, the proposed redevelopment has been assessed based on having a net increase in vehicle generation of around 185 and 193 vehicle trips respectively in the weekday AM and PM peak hours. The differential in traffic uplift is based on the existing commercial building with ground floor retail generating low traffic volumes (one and nine vehicle trips during each peak hour), however the new commercial and specialty retail land use is assessed based on full traffic yield as per traffic generation rates agreed with Transport for NSW and Council.

The existing pedestrian crossing along Rawson Street on the southern edge of the Council car park currently operates near or at capacity during weekday peak hours during the high pedestrian volumes traveling to / from the rail and bus interchange at Beecroft Road. The development proposes to deliver pedestrian operated signals to better manage the

[1] Parramatta LEP 2011 classified the site as B2 – Local Centre, updated to E1 – Local Centre as part of LEP 2023

flow of traffic and pedestrians. These signals present a significant benefit to the operation of Rawson Street generally during peak periods and would improve access to both existing and future development within the town centre.

The traffic assessment considers uplift in background traffic generated by potential developments within Epping Town Centre, resulting in a further uplift of 249 and 296 vehicles in the weekday AM and PM peak hour.

Traffic analysis presented in this report indicates it is clear the development has a relatively minor impact on the operation of surrounding intersections, with or without background traffic growth from developments within the town centre, with exception of the Carlingford Road/ Rawson Street/ Ray Road intersection during the AM peak hour specifically due to the limited capacity of the right turn from Rawson Street to Carlingford Road to accommodate an uplift in traffic. Notwithstanding, the provision of a third eastbound lane along Carlingford Road between Rawson Street and Beecroft Road would result in increased capacity for vehicles exiting Rawson Street and allow for similar performance of the intersection following development of the site, however may not deliver enough capacity to accommodate all potential development within the town centre.

In the context of the broader aspirations surrounding development within Epping Town Centre, as well as aspirations surrounding development that promotes sustainable travel given proximity to a rail and bus interchange and integrated land uses that co-locates jobs, housing and retail, thereby containing trips internally to Epping, the impacts of the Planning Proposal can, on this assessment be satisfactorily managed.

Epping Town Centre has experienced significant uplift in development over the past 10 years, however TfNSW traffic volume viewer count stations evidence that background traffic volumes have had no discernible growth for more than a decade. It is evident that the capacity constraints of the key intersections in Epping Town Centre have displaced non-essential traffic to other regional routes to accommodate newly generated traffic from within the centre. This is not unlike other capacity restrained centre in Sydney metropolitan area such as Chatswood Town Centre and the capacity constrained Pacific Highway.

Further review of traffic data collated along Carlingford Road between 2019 and 2023 indicates there has been no change in traffic volumes and further, that COVID 19 has had no impact. Whilst the traffic modelling undertaken in this assessment is a theoretical assessment of the potential impact, the growth in Epping over the past decade has evidenced that any additional traffic from developments along Rawson Street will simply continue to displace non-essential traffic with no discernible net growth.

Previous and Updated Development Yield Comparison

Table A summarises the change in development yield between the updated development yield and previous yield assessed in the August 2023 report and RFI response letter provided on 19 February 2024.

Table A – Development yield comparison

	August 2023 report/ RFI response letter Development Yield	Updated Development Yield
Residential	420 units	420 units
Commercial	2,757 sqm GFA	7,430 sqm GFA
Retail	6,343 sqm GFA	6,247 sqm GFA

Table B summarises the comparison between the net increase in vehicle trips between the previous and updated development yield. The updated development yield results in an additional 41 trips in the AM peak and 29 trips in the PM peak compared to the previous development yield assessed in the August 2023 report and RFI response letter.

Table B – Traffic generation comparison

	August 2023 report/ RFI response letter Development Yield		Updated Development Yield	
	AM	**PM**	**AM**	**PM**
Net increase in vehicle trips compared to existing (used for SIDRA assessment)	144	164	185	193

Table C and D summarises the Level of Service (LOS) of each of the key intersections for the previous and updated development yields respectively. As the results show, the differences in LOS between the two development yield schemes are minor. There will be some improvements at the intersection between Carlingford Road and Beecroft Road for Scenario 4 AM peak and the intersection between Carlingford Road and Midson Road for Scenario 2 AM peak. The LOS at the intersection between Carlingfor Road and Midson Road for Scenario 2 PM peak will go from LOS D to E.

Table C – Level of Service for previous development yield

Intersection	Peak	Level of Service			
		Existing	Scenario 2	Scenario 3	Scenario 4
Carlingford Rd/ Beecroft Rd	AM	D	D	D	E
	PM	D	D	E	E
Carlingford Rd/ Ray Rd/ Rawson St	AM	C	D	D	F
	PM	B	C	C	C
Carlingford Rd/ Midson Rd	AM	D	E	E	E
	PM	D	D	D	E
Epping Rd/ Blaxland Rd/ Beecroft Rd	AM	C	C	C	C
	PM	D	D	E	E
Rawson Street/ Bridge St	AM	B	B	B	B
	PM	B	B	A	B
Rawson Street pedestrian crossing (signalised)	AM	C [1]	A [2]	E [1]	A [2]
	PM	C [1]	A [2]	F [1]	A [2]
Rawson Street Site Access	AM	N/a	A	N/a	B
	PM	N/a	B	N/a	A

Table D – Level of Service for updated development yield

Intersection	Peak	Level of Service			
		Existing	Scenario 2	Scenario 3	Scenario 4
Carlingford Rd/ Beecroft Rd	AM	D	D	D	D
	PM	D	D	E	E
Carlingford Rd/ Ray Rd/ Rawson St	AM	C	D	D	F
	PM	B	C	C	C
Carlingford Rd/ Midson Rd	AM	D	D	E	E
	PM	D	E	D	E
Epping Rd/ Blaxland Rd/ Beecroft Rd	AM	C	C	C	C
	PM	D	D	E	E
Rawson Street/ Bridge St	AM	B	B	B	B
	PM	B	B	A	B
Rawson Street pedestrian crossing (signalised)	AM	C [1]	A [2]	E [1]	A [2]
	PM	C [1]	A [2]	F [1]	A [2]
Rawson Street Site Access	AM	N/a	A	N/a	B
	PM	N/a	B	N/a	B

1. Introduction

1.1 Background and Proposal

A Planning Proposal has been lodged with Parramatta City Council (Council) to amend the current planning controls for the current site located at 53-61 Rawson Street, Epping. The Proposal seeks to amend the planning controls in the Parramatta Local Environment Plan (LEP) 2023 to permit mixed-use development on land currently zoned E1 (Local Centre)[2] and increase the maximum floor space ratio and height controls that currently apply to the site.

An indicative development yield for the site comprises some 420 residential apartments set above 7,430 and 6,247 square metres of commercial and retail Gross Floor Area, respectively.

Stantec has been commissioned by Canjs Pty Ltd to undertake a transport impact assessment for the proposed development.

This report has been prepared as an update to the August 2023 report and in addition to the RFI response provided on 19 February 2024, to reflect the revised planning proposal responding to Council's RFI of December 2023 and including the additional non-residential floor space of 0.5:1.

1.2 Site Context

A key strategic merit of the development is the opportunity to promote sustainable travel given the high-density mixed-use nature of the development within a strategic centre; and within 200 metres of a rail and bus interchange that provides convenient access to local and regional residential, commuter, retail and recreational centres.

In addition, the integrated land uses provided across Epping Town Centre generally (existing, approved and future development) provide opportunities for co-location of jobs, housing and retail, providing opportunity to contain trips internally to Epping thereby minimising external traffic and continue to facilitate evenly split bi-directional trips for more equitable utilisation of public transport services and road infrastructure in and out of Epping Town Centre across the day.

The development also has the potential to make a further positive contribution to the surrounding area by providing a new retail precinct at the gateway to Epping Town Centre with a supermarket and speciality retail offerings, as well as an expanded and permeable public domain.

1.3 Purpose of this Report

This report sets out an assessment of the anticipated transport implications of the proposed development, including consideration of the following:

- existing traffic and parking conditions surrounding the site
- suitability of the proposed parking in terms of supply (quantum) and layout
- service vehicle requirements
- pedestrian and bicycle requirements
- the traffic generating characteristics of the proposed development
- suitability of the proposed access arrangements for the site
- the transport impact of the development proposal on the surrounding road network.

1.4 Agency Consultation

Oakstand in conjunction with Stantec (formerly GTA Consultants) have engaged with Council on the redevelopment of the site since 2014, initially cumulating in the preparation of a joint traffic study of Epping Town Centre by Stantec and AECOM in response to a traffic study brief provided by Council. More recently, the project team has engaged with Council consistently throughout 2021 and 2022 as it relates to development planning matters for this planning proposal, with traffic being a key discussion item.

[2] Parramatta LEP 2011 classified the site as B2 – Local Centre, updated to E1 – Local Centre as part of LEP 2023

Prior to preparation of the Transport Impact Assessment, a scoping study was also provided to both Council and Transport for NSW to provide input on the proposed methodology/ assumptions. This report addresses commentary received from Transport for NSW[3], as referenced in Table 1.1.

Table 1.1 – Transport for NSW commentary addressed in report

Description	Comment	Relevant Report Section
General	• With the diversity of mix of uses proposed on the development site (including residential, commercial, and retail) the proposed development should encourage sustainable modes of transport such as walking, cycling and the use of public transport to key destinations	Section 4, 5, 7, 9
	• The Planning Proposal should include Traffic, Transport and Parking Study to investigate likely travel mode demands and investigation on systems to minimise impact to the surrounding classified and local road networks.	Section 5, 8.2
Vehicular Traffic	• Detailed assessment, including traffic survey and future modelling scenarios during peak periods of the surrounding road network to identify the suitability of required improvements to the road network to facilitate the Planning Proposal and to consider cumulative impacts from existing and planned surrounding developments.	Section 2.3, 2.4, 8
Active Transport	• Provision of end of trip facilities to encourage and support workers within the Planning Proposal in active transport options. • Identify specific walking and cycling infrastructure projects that may be delivered by developer contributions.	Section 7, 8
Loading and Servicing	• Investigate opportunities to facilitate loading and servicing facilities off-street and provide separation for private vehicles and pedestrian activity for improved safety. Details should align with relevant guidelines (eg. TfNSW Freight and Servicing Last Mile Toolkit).	Section 6.3
Parking	• Investigate opportunities for car share systems within the Planning Proposal to support businesses and residents to reduce private vehicle dependency. The study should identify the locations and provision of such services.	Section 6.2.2

Stantec have continued to engage with Transport for NSW to confirm traffic modelling assumptions. A record of correspondence with stakeholders is detailed in Table 1.2 and provided in Appendix A.

Table 1.2 – Record of stakeholder correspondence

Date of Correspondence	Author	Description	Relevant Report Section
September 2022	Stantec	Scoping Study	Appendix A.1
March 2023	Transport for NSW	Transport for NSW response to scoping study	Appendix A.2
June 2023	Stantec	Stantec response to Transport for NSW requesting concurrence on traffic generation rates and traffic growth assumptions	Appendix A.3
July 2023	Transport for NSW	Transport for NSW response to Stantec	Appendix A.4
August 2023	Stantec	Stantec response to Transport for NSW outlining approach to retail traffic generation rates and traffic growth assumptions	Appendix A.5

1.5 References

In preparing this report, reference has been made to the following:

- an inspection of the site and its surrounds
- Parramatta Development Control Plan 2011 (DCP), including specific reference to Section 4.1 – Town and Neighbourhood Centres
- Parramatta Local Environmental Plan (LEP) 2023
- Australian Standard/ New Zealand Standard, Parking Facilities, Part 1: Off-Street Car Parking AS/NZS 2890.1:2004
- Australian Standard, Parking Facilities, Part 2: Off-Street Commercial Vehicle Facilities AS 2890.2:2018
- Australian Standard / New Zealand Standard, Parking Facilities, Part 6: Off-Street Parking for People with Disabilities AS/NZS 2890.6:2022
- traffic and car parking surveys undertaken by Geocounts and Matrix as referenced in the context of this report
- plans for the proposed development prepared by KANNFINCH

[3] Scoping paper (pre-planning proposal), mixed use development, 53-61 Rawson Street, Epping, Transport for NSW, 29 March 2023

- other documents and data as referenced in this report.

2. Existing Conditions

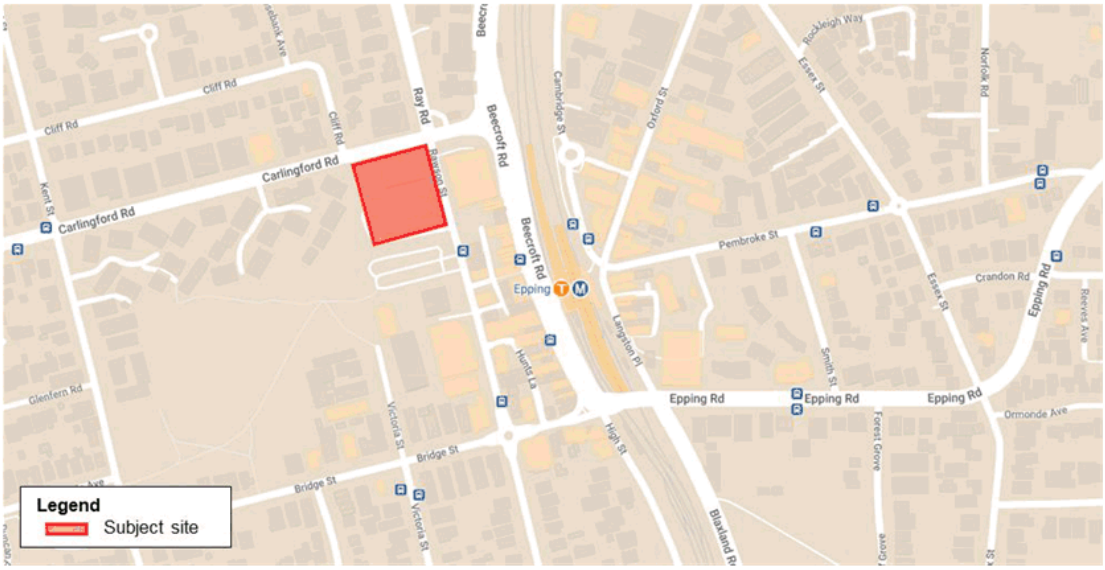
2.1 Location

The subject site is located at 53-61 Rawson Street, Epping and is Lot 7 of DP19329 and Lot 1 of DP 710711. The site of approximately 9,089 square metres has a frontage of 100 metres to Rawson Street and 95 metres to Carlingford Road.

The site currently has a land use classification as E1 – Local Centre under LEP 2023. It is occupied by a five-storey commercial building adjacent to a supermarket, each with basement or under croft parking, with at-grade parking spanning the western edge of the site allocated to the supermarket. The surrounding properties predominantly include high-density residential, retail and commercial uses.

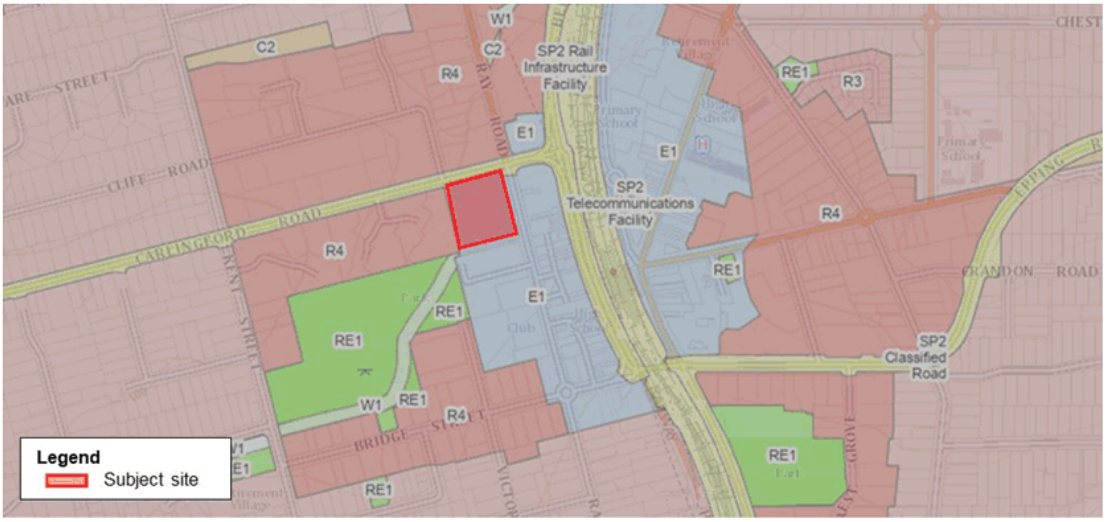
The location of the subject site and its surrounding environs is shown in Figure 2.1, while the LEP 2023 land use map is shown in Figure 2.2.

Figure 2.1: Subject site and its environs



Base image source: Google Mymaps, accessed June 2023

Figure 2.2: Land Use Map



Base image source: ePlanning Spatial Viewer, accessed June 2023

2.2 Road Network

2.2.1 Road Hierarchy

Roads are classified according to the functions they perform. The main purpose of defining a road's functional class is to provide a basis for establishing the policies which guide the management of the road according to their intended service or qualities.

In terms of functional road classification, State roads are strategically important as they form the primary network used for the movement of people and goods between regions, and throughout the State. Transport for NSW (TfNSW) is responsible for funding, prioritising and carrying out works on State roads. State roads generally include roads classified as freeways, state highways, and main roads under the Roads Act 1993, and the regulation to manage the road system is stated in the Australian Road Rules, most recently amended on 19 March 2018.

TfNSW defines four levels in a typical functional road hierarchy, ranking from high mobility and low accessibility, to high accessibility and low mobility. These road classes are:

Arterial Roads – Controlled by TfNSW, typically no limit in flow and designed to carry vehicles long distance between regional centres.

Sub-Arterial Roads – Managed by either Council or TfNSW under a joint agreement. Typically, their operating capacity ranges between 10,000 and 20,000 vehicles per day, and their aim is to carry through traffic between specific areas in a sub region or provide connectivity from arterial road routes (regional links).

Collector Roads – Provide connectivity between local sites and the sub-arterial road network, and typically carry between 2,000 and 10,000 vehicles per day.

Local Roads – Provide direct access to properties and the collector road system and typically carry between 500 and 4,000 vehicles per day.

2.2.2 Surrounding Road Network

A schedule of the existing road network is shown in Table 2.1, with key roads illustrated in Figure 2.3 through to Figure 2.6.

Table 2.1: Road Network

Road	Classification	Description
Beecroft Road (MR139)	Arterial Road	• North-south connection between Pennant Hills Road in the north and Epping Road in the south • Generally four lane, bidirectional road near the site, with ancillary turn lanes • 60 km/h speed zoning • Parking is generally not permitted on the road near the site
Carlingford Road (MR373)	Arterial Road	• East-west connector between Epping in the east and Carlingford in the west • Four-lane, bidirectional road • 60km/h speed zoning • Parking is not permitted on either side of the road
Rawson Street	Local Council Road	• North-south connector between Carlingford Road in the north and Bridge Street/ Chesterfield Road in the South • Two lane, bidirectional road • 50km/hr speed zoning, with local traffic calming measures • Parking is generally permitted however subject to time restrictions on both sides of the road
Ray Road	Local Council Road	• North-south connector between Kandy Avenue in the north and Carlingford Road in the south • Two-lane, bidirectional road • 50km/hr speed zoning • Parking is permitted at off-peak times on both sides of the road
Bridge Street	Local Council Road	• East-west connector between Epping Road in the east and Kent Street in the west • Two-lane, bidirectional road • 50km/h speed zoning • Parking is generally permitted however subject to time restrictions on both sides of the road
Cliff Road	Local Council Road	• Multi-directional local connector between Carlingford Road and the residential area north

Figure 2.3 – Rawson Street (looking north)

Figure 2.4 – Carlingford Road (looking east)

Figure 2.5 – Beecroft Road (looking south)

Figure 2.6 – Ray Road (looking north)

2.3 Traffic Volumes

2.3.1 Traffic Counts

On Thursday, 11 November 2022, Stantec commissioned traffic movement counts and queue length surveys at the following key intersections, as illustrated at Figure 2.7:

1. Carlingford Road and Beecroft Road
2. Carlingford Road, Rawson Street and Ray Road
3. Rawson Street and Bridge Street.

Traffic and pedestrian movement counts were also completed at the following locations along Rawson Street as illustrated in Figure 2.8:

a) Commercial building car park entry/ exit driveway, and coles exit driveway
b) Coles entry driveway
c) Rawson Street Council car park exit driveway
d) Rawson Street Council car park entry driveway
e) Pedestrian crossing along Rawson Street, proximate to Rawson Street Council car park.

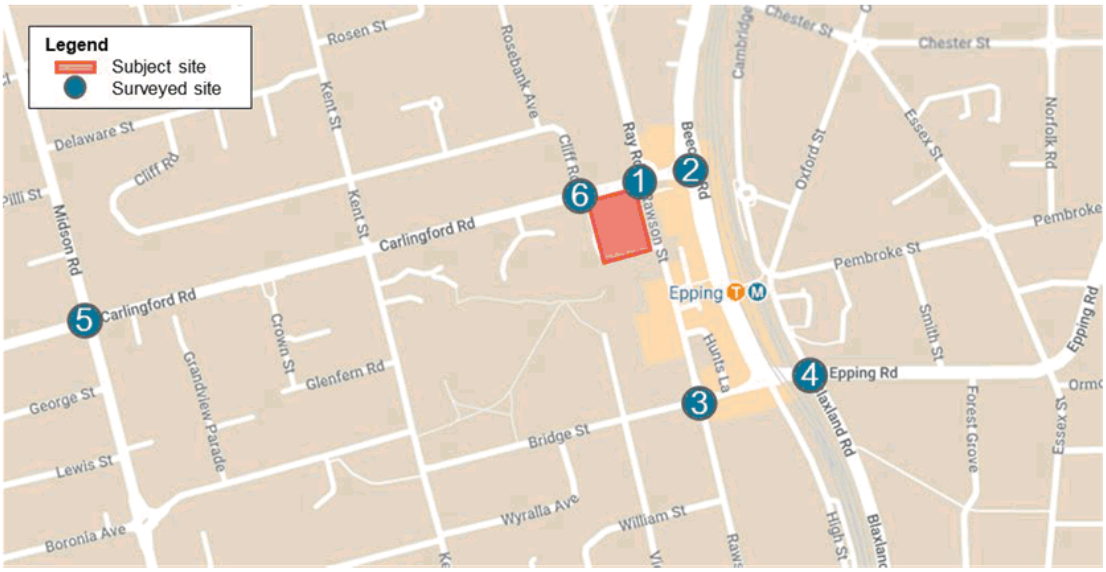
Counts were completed for the following periods:

- 6:30am to 9:30am
- 3:00pm to 7:00pm.

Following submission of the Scoping Study to Transport for NSW for comment, Transport requested traffic modelling be completed for an extended survey area. As such, Stantec commissioned traffic movement counts and queue length surveys on Thursday, 18 May 2023 at the following additional intersections, as illustrated at Figure 2.7:

4. Epping Road, Blaxland Road and Beecroft Road
5. Carlingford Road and Midson Road
6. Carlingford Road and Cliff Road.

Figure 2.7 – Traffic survey locations – intersections



Base map source: Google mymaps

Figure 2.8 – Traffic survey locations – Rawson Street driveways

Base image source: Nearmap

In order to prepare SIDRA intersection models for a consistent period, Stantec also obtained SCATS detector count data from Transport for NSW at the Carlingford Road/ Beecroft Road and Carlingford Road/ Rawson Street/ Ray Road intersections for both survey periods. The common AM and PM peak hours in 2023, based on traffic counts and SCATS detector counts at the various intersections, were found to occur from 7:30 am to 8:30 am, and 4:15 pm to 5:15 pm respectively.

The SCATS detector count data were adopted as the existing traffic volumes for the Carlingford Road/ Beecroft Road and Carlingford Road/ Rawson Street/ Ray Road intersections, with the relative split of turning vehicles at the Carlingford Road/ Rawson Street/ Ray Road determined based on the splits observed in 2022. Across both intersections, a review of the 2022 and 2023 SCATS data indicated that traffic volumes had increased by two per cent in the AM peak and reduced by one per cent in the PM peak period. A further review of traffic growth generally on the road network is discussed in Section 8.4.

The weekday AM and PM peak hour traffic flows for the key intersections are summarised at Appendix D.

2.3.2 Origin Destination Surveys

Stantec also commissioned origin destination surveys on 24 June 2021 for the right turn movement from Rawson Street onto Carlingford Road, to understand the relative percentage of traffic turning right that is generated from within the town centre (i.e. their origin commences north of Bridge Street) or from external to the town centre (i.e. their origin commences prior to Bridge Street). The surveys are provided at Appendix F.

The surveys found that during the AM period (6:30am to 9:30am) and PM period (3:00pm to 7:00pm), around 71 and 39 per cent of traffic originates from external to the town centre respectively. Further, during the specific peak hours identified in Section 2.3.1, 67 per cent and 43 per cent of traffic originates from external to the town centre.

These results indicate that Rawson Street is currently used as a rat run for vehicles external to the town centre to turn onto Carlingford Road and travel south towards Epping Road/ Blaxland Road, particularly during the AM peak period.

2.4 Intersection Operation

2.4.1 Modelling Software Package

The operation of the key intersections within the study area has been assessed using SIDRA INTERSECTION[4], a modelling software package which calculates intersection performance.

The commonly used measure of intersection performance, as defined by the RTA, is vehicle delay. SIDRA INTERSECTION determines the average delay that vehicles encounter and provides a measure of the level of service.

Table 2.2 shows the criteria that SIDRA INTERSECTION adopts in assessing the level of service.

Table 2.2: SIDRA INTERSECTION Level of Service Criteria

Level of Service (LOS)	Average Delay per vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Sign
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Near capacity	Near capacity, accident study required
E	57 to 70	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode
F	Greater than 70	Extra capacity required	Extreme delay, major treatment required

2.4.2 Model Set Up, Calibration and Validation

The model comprises key intersections shown in Figure 2.7, with exception of the Carlingford Road/ Cliff Road intersection, noting these volumes were collected in order to understand any impacts of the development of a the DCP service lane (discussed in Section 3.2.2) to cliff road should it form a substantial new intersection with Carlingford Road. All intersections have been modelled as a network model.

The model also includes the Rawson Street midblock pedestrian crossing located near the Council car park as shown at Figure 2.8. The pedestrian crossing does impact the operation of Rawson Street during peak periods particularly for vehicles traveling north, with queues extending back to the Bridge Street roundabout in the PM peak period. The model excludes the second Rawson Street midblock pedestrian crossing near Hunts Lane, noting site observations indicates this crossing has negligible additional impact to the operation of the road network given it carries significantly less pedestrian volumes during peak periods, with any northbound queueing at this crossing a result of queues spilling back from the crossing near the Council car park.

While the pedestrian crossing does experience heavy foot traffic during peak periods, pedestrian volumes are observed to arrive in bunches. For pedestrians traveling from the western edge of Rawson Street towards Beecroft Road, bunching was observed to primarily result from the controlled movement of pedestrians from the Carlingford Road/ Rawson Street intersection, noting 200 to 300 pedestrians travel across the western leg of this intersection during the relevant peak hours. For pedestrians travelling from the eastern edge of Rawson Street, it is expected the bunching of pedestirans is influenced by the arrival of public transport services along Beecroft Road. Stantec reviewed video footage for the relevant peak hours and found that on average, pedestrians crossed the intersection for 12 second intervals with 12 and eight second intervals in between allowing for vehicles to travel across the intersection, respectively during the AM and PM peak hour. As such, respectively during the AM and PM peak hour, 50 and 40 per cent of the hour the crossing is clear of pedestrians allowing vehicles to travel through. To replicate this bunching and to ensure the degree of saturation remains at or under 1.0, an opposing pedestrian factor of 0.8 and 0.84 was applied respectively in the AM and PM peak periods. SIDRA results indicate a 95 percentile queue in the PM peak period of around 100 metres, which is less than the observed queue of around 170 metres (i.e. queueing extends back to the Bridge Street roundabout). To better reflect this queue and the observed operation of the intersection and bunched arrivals of pedestrians, the crossing was set up as a pedestrian operated signal with phase times based on the recorded intervals noted above. Notwithstanding, this

[4] Program used under license from Akcelik & Associates Pty Ltd.

approach yielded no improvement to the length of queue without pushing the degree of saturation over 1.0. Further discussion around the operation of this pedestrian crossing and recommended mitigation measures are outlined in Section 8.6.3.

Noting the above, given the extent of queue back from the pedestrian crossing in the network model does not reach the Bridge Street roundabout and hence impact operation of this intersection, roundabout environment factors have been included to better reflect this condition and ensure the model reflects the observed 95 percentile queues during the relevant peak hours.

Historical SCATS phasing data for each signalised intersection on Thursday, 18 May 2023 and the LX file has also been obtained from TfNSW to assist with calibrating and validating the traffic model and to understand offset and link plan details. Detailed calibration notes, included coded offsets, are presented in Appendix C. The existing condition models are consistent with recorded and observed queue lengths and SCATS phasing data.

2.4.3 Results

Table 2.3 presents a summary of the existing operation of the key intersections, with full results presented in Appendix E.

Table 2.3: Existing operating conditions

Intersection	Peak Period	Degree of Saturation (DOS)	Average Delay (sec)	Average Queue (m)	Level of Service (LOS)
Carlingford Rd/ Beecroft Rd	AM	0.98	50	197	LOS D
	PM	0.98	51	277	LOS D
Carlingford Rd/ Ray Rd/ Rawson St	AM	0.95	36	160	LOS C
	PM	0.87	25	94	LOS B
Carlingford Rd/ Midson Rd	AM	0.90	54	141	LOS D
	PM	0.95	53	155	LOS D
Epping Rd/ Blaxland Rd/ Beecroft Rd	AM	0.96	29	163	LOS C
	PM	0.98	43	250	LOS D
Rawson Street/ Bridge St	AM	0.65	18	17	LOS B
	PM	0.72	18	23	LOS B
Rawson Street pedestrian crossing (unsignalised)	AM	0.98	31	33	LOS C
	PM	0.99	39	39	LOS C

Table 2.3 indicates the surrounding arterial road network is operating close to capacity, indicated by the high degree of saturations generally ranging between 0.87 and 0.99 with exception of the Rawson Street/ Bridge Street intersection that generally operates well and with spare capacity.

2.5 Public Transport

2.5.1 Existing Services

The site is ideally located relative to public transport service. Access can be gained to a multitude of services, including the metro, train and bus, providing connectivity across Sydney and the opportunity for interchange to destinations / origins in Sydney's outer areas.

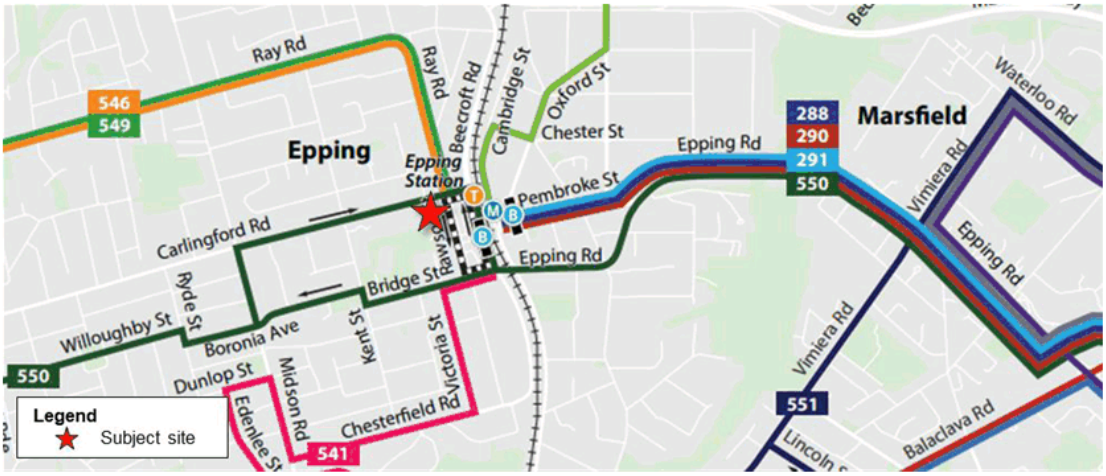
Epping railway station is approximately 200 metres (three minute walk) to the south-east, providing both train services along the Hornsby the North Shore via City line (T9), as well as metro services along the Chatswood to Tallawong Line, set to be expanded to travel from Chatswood to Sydenham and through to Bankstown in 2024 as discussed in Section 2.5.2. At peak periods, the station is serviced every three to five minutes by the metro, and every two to eight minutes by train.

A review of the main public transport services available near the site is summarised in Table 2.4 and shown indicatively in Figure 2.9 and Figure 2.10.

Table 2.4: Public Transport Provision

Service	Route #	Route Description	Distance to Nearest Stop	AM/ PM Peak frequency	Interpeak Frequency
Metro	M	Chatswood to Tallawong	200 metres	3-5 minutes	10 minutes
Train	T9	Hornsby to North Shore via City	200 metres	2-8 minutes	30 minutes
	CCN	Central to Newcastle	200 metres	15 minutes	15 minutes
Bus	228, 290, 291	Epping to City (amalgamated)	250 metres	10-15 minutes	10-15 minutes
	546, 549, 550	Epping to City (amalgamated)	150 metres	8-10 minutes	10-15 minutes
	541	Epping to Eastwood	100 metres	30 minutes	1 hour
	651	Rouse Hill to Epping	50 metres	30 minutes	1 hour

Figure 2.9 – Surrounding public transport network (North West bus network)



Source: North West Sydney bus network map – Effective: 12 December 2022, accessed June 2023

Figure 2.10: Surrounding public transport network (Hills District bus network)

Source: Hills District bus guide – network map weekday services as at 15 May 2023, CDC NSW, accessed June 2023

2.5.2 Future Services

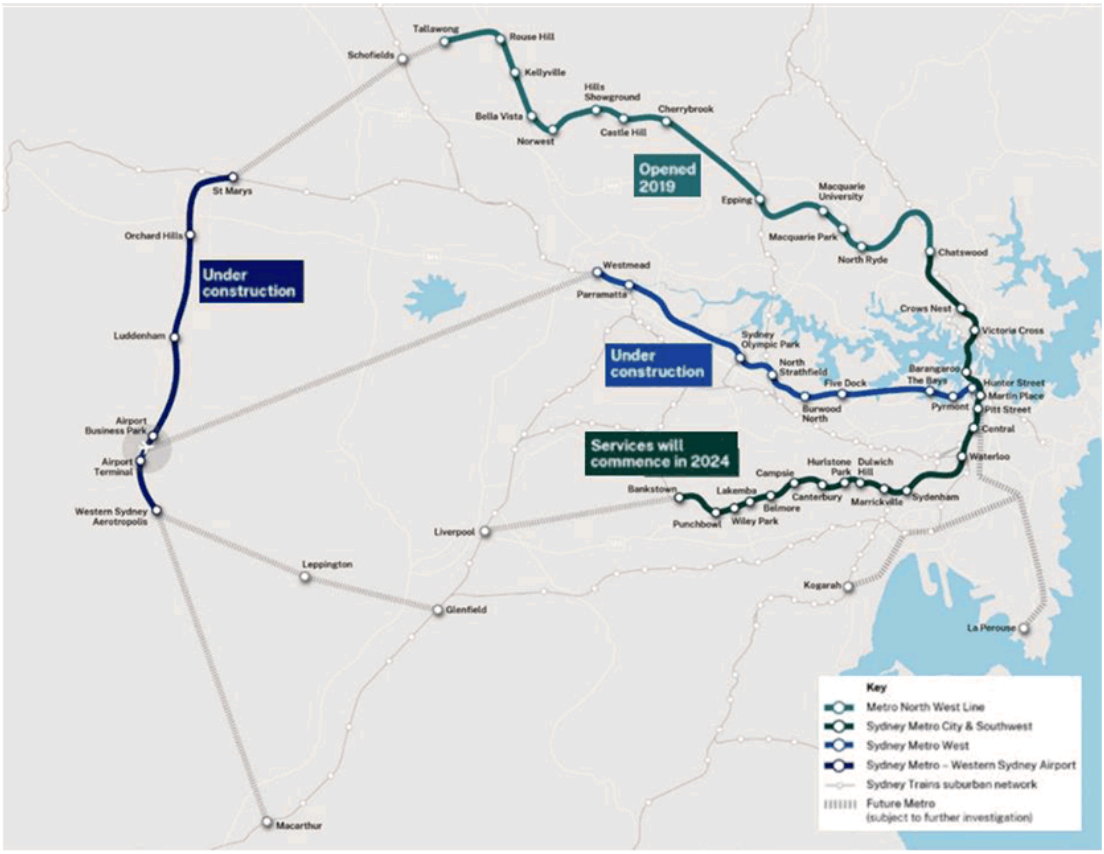
Sydney Metro north west, city and south west is currently Australia's largest public transportation project, which seeks to deliver over 65 kilometres of metro rail between Rouse Hill and Bankstown with 31 new metro stations. Stage 1 services began operating in May 2019 using automated metro trains with the expansion into the Sydney CBD and beyond to the south-west expected to be completed in 2024. Sydney Metro aims to provide a metro train every two minutes in each

direction within the Sydney CBD. Train services entering the Sydney CBD are proposed to increase from about 120 an hour to 200 services beyond 2024.

In addition, construction has commenced for the Sydney Metro West, proposed to connect Greater Parramatta with the Sydney CBD. The project intends to double rail capacity between the two CBDs and comprises seven confirmed stations including at Sydney Olympic Park. Planning is also underway for the Sydney Metro Greater West, planned between St Marys Railway Station and Western Sydney Aerotropolis.

An overview of the future Sydney Metro network is shown at Figure 2.11. As it applies to planning in relation to the subject site and broader Epping Town Centre precinct upgrades to the Sydney Metro network are planned to considerably increase rail network capacity by introducing new high-capacity rail connections from the Sydney CBD to other key economic centres in the broader Sydney area.

Figure 2.11: Existing and planned Sydney Metro route upgrades



Base image source: Figure 0-1 Sydney Metro network map, Parramatta Over and Adjacent Station Development Environmental Impact Statement, Sydney Metro and Ethos Urban, November 2022

2.6 Walking and Cycling Infrastructure

2.6.1 Walking Infrastructure

Epping Town Centre caters well for high pedestrian activity with established pedestrian networks, footpaths, through site connections and provision of ample formal crossing facilities. Pedestrian activity is generally high, especially to/ from Epping Railway Station during the weekday peak periods, particaulrly from surrounding residential precincts including high density residential developments north of Carlingford Road.

Pedestrian access from the site to Epping Railway Station is provided via two pedestrian cut throughs between Rawson Street and Beecroft Road as shown in Figure 2.12 and Figure 2.13, and a pedestrian bridge over Beecroft Road as shown in Figure 2.5.

Figure 2.12 – Pedestrian lane between Rawson Street and Beecroft Road (looking west)

Figure 2.13 –Pedestrian connection between Rawson Street and Beecroft Road through the Epping Walk Arcade (looking west)

All surrounding local roads generally provide footpaths on both sides of the roads close to site. Formalised crossing points in vicinity of the site include the following pedestrian crossings:

- All legs of the Carlingford Road/ Rawson Street/ Bay Street intersection
- West leg and slip lanes of the Beecroft Road/ Carlingford Road intersection.

A zebra crossing is also present midblock along Rawson Street just south of Council car park and proximate to the pedestrian cut throughs to Beecroft Road, providing a natural desire line to the Railway Station for pedestrians traveling to/ from the west through Boronia park, or to residential precincts located along Carlingford Road north/ north-west of the site.

Stantec commissioned pedestrian surveys at the Rawson Street pedestrian crossing proximate to the Council car park on Thursday, 17 November 2022 between 6:30am to 9:30am and 3:00pm to 7:00pm. Pedestrian volumes for each hour period are detailed in Figure 2.14, illustrating a peak volume of around 670 pedestrians between 7:45am to 8:45am and 950 pedestrians between 3:15pm to 4:15pm. Pedestrian activity experienced a distinct peak in the morning and then steadily reduced as standard work/ school hours commenced however activity remained high throughout the entire PM peak period, reflecting the continuous arrival and departure profiles of school students and commuters returning home, employees leaving and pedestrians visiting the various retail and commercial offerings within the Town Centre during the afternoon/ evening.

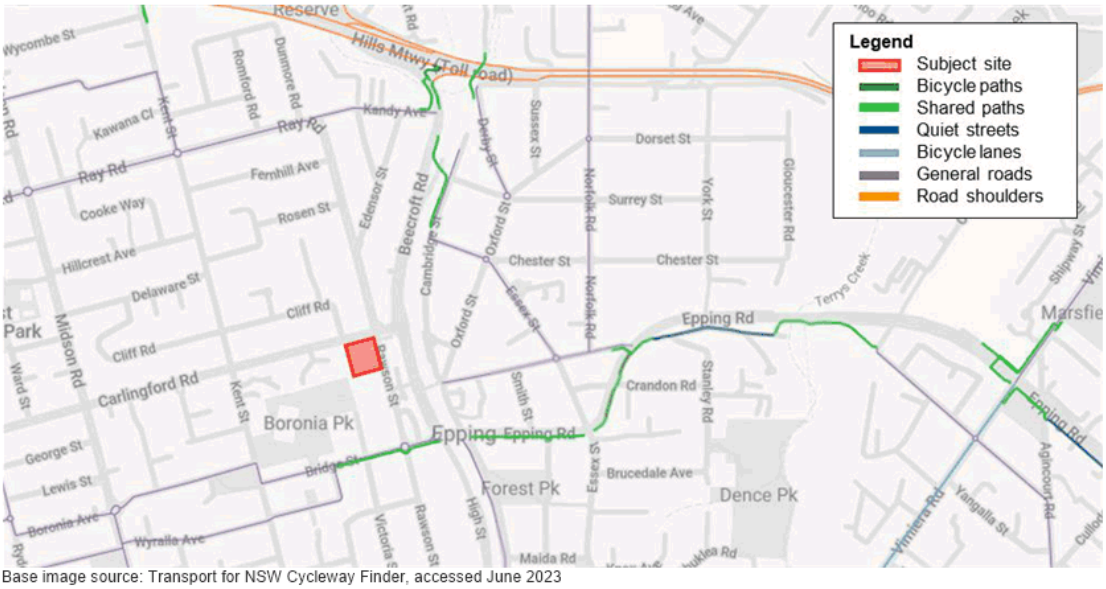
Figure 2.14: Rawson Street pedestrian crossing – hourly pedestrian volumes (Thursday, 17 November 2022)

2.6.2 Cycling Infrastructure

The site is modestly serviced by surrounding cycling infrastructure. An off-road shared path running along Bridge Street and Epping Road is located just south of the site, connecting users to Macquarie Park and through to the city via the North Shore. Furthermore, a range of on-road bike routes are provided along Ray Road and Midson Road providing routes west and south west of site.

The surrounding cycling infrastructure is shown in Figure 2.15.

Figure 2.15: Surrounding Cycling Network



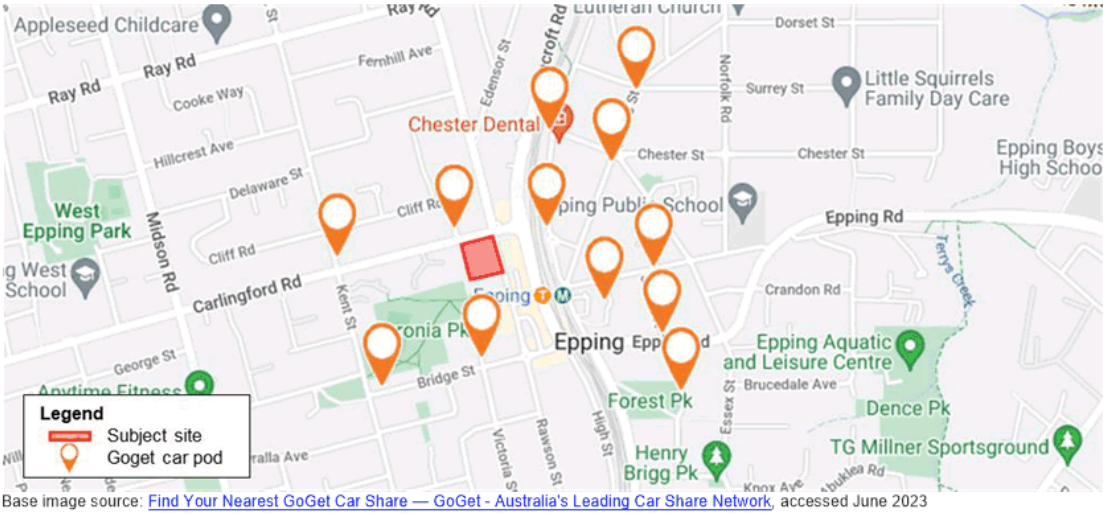
Base image source: Transport for NSW Cycleway Finder, accessed June 2023

2.7 Local Car Share Initiatives

Car share schemes have become increasingly common throughout Sydney and are now recognised as a viable transport option for drivers throughout Sydney. They offer a viable alternative to the private car for trips where distances are short and are likely to be of benefit to future residents and commercial tenants of the proposed development.

GoGet car share pods located close to the site are shown in Figure 2.16, with the closest pod located on-street along Cliff Road.

Figure 2.16: Surrounding GoGet pod locations

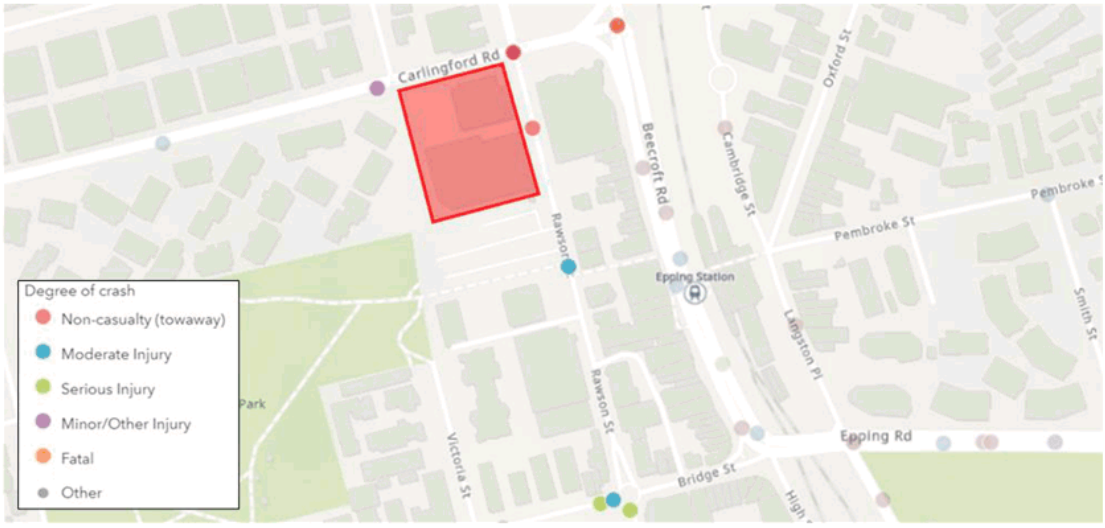


Base image source: Find Your Nearest GoGet Car Share — GoGet - Australia's Leading Car Share Network, accessed June 2023

2.8 Crash History

An analysis the most recent five-year period of available crash data (2017 - 2021) has been undertaken based on crash data provided by TfNSW for the roads surrounding the site. The locations and severity of the crash data for the five-year period is shown in Figure 2.17 and detailed in Table 2.5.

Figure 2.17: Crash incidences near Subject Site (2017 to 2021)



Base image source: Transport for NSW

Table 2.5: Recorded crashes

Intersection	Number of incidents	Notes
Beecroft Road/ Carlingford Road	3	• Two incidents occurred during the day • Two crashes resulted in a towaway and the other resulted in a serious injury that resulted in six injured
Carlingford Road/ Rawson Street/ Ray Road	6	• Five out of the six crashes occurred during the day • Four of the crashes resulted in a towaway, one resulted in a minor injury and the other resulted in a moderate injury
Carlingford Road/ Cliff Road	1	• Resulted in a minor injury during the day
Midblock along Rawson Street	3	• Two out of the three crashes occurred during the day • One crash resulted in a towaway, another in a moderate injury, and the other in a serious injury
Rawson Street/ Bridge Street	3	• All crashes occurred during the day • Two out of the three crashes resulted in serious injuries, with the other one resulting in a moderate injury

The following key statistics can be drawn from the crash data:

- No fatalities were recorded during the five-year period.
- Approximately 56 per cent of crashes resulted in an injury.
- Approximately 81 per cent of crashes occurred during daylight hours.

3. Strategic Transport Setting

3.1 Relevant State Strategies and Plans

3.1.1 The NSW Government Future Transport 2056 Strategy

Future Transport 2056 provides a 40-year strategy for how transport will be planned, amended and forecasted within NSW, both regional and metropolitan, for the expected 12 million residents within the state. Future Transport 2056 follows from the 2012 Long Term Transport Master Plan which listed over 700 transport projects, the majority of which are completed or in progress. It also compliments the Greater Sydney Region Plan and the subsequent district plans which support the three cities metropolis vision.

Future Transport 2056 is supported by two key documents, Greater Sydney Services and Infrastructure Plan and Regional NSW Services and Infrastructure Plan, which provide guidance and planning for these areas.

From a metropolitan view, Future Transport 2056 and associated plans include the 30-minute city where jobs and services are within 30-minutes of residents with Greater Sydney. Strategic transport corridors to move people and goods are outlined between metropolitan and strategic centres, clusters and surrounds. The Movement and Place framework is also emphasised to support liveability, productivity and sustainability.

3.1.2 The Greater Sydney Region Plan – A Metropolis of Three Cities

The Greater Sydney Commission presents a vision for three, integrated and connected cities that will rebalance Greater Sydney – placing housing, jobs, infrastructure and services within a 30-minute reach of more residents, no matter where they live.

Specifically, the following strategic plans and initiatives are relevant to the study are:

- Improving transport, walking and cycling connections across the district.
- Delivering the Sydney Metro West
- Delivering integrated land use and transport planning and a 30-minute city.

The Greater Sydney Commission's vision is to create three connected cities; a Western Parkland City west of the M7, a Central River City with Greater Parramatta at its heart and an Eastern Harbour City. By integrating land use, transport links and infrastructure across the three cities, more people will have access within 30-minutes to jobs, schools, hospitals and services.

3.1.3 Central City District Plan

The Eastern City District Plan was also produced by the State Government and complements at a more specific level the themes identified in the Region Plan. It presents a 20-year plan to manage growth in the context of economic, social and environmental matters to achieve the 40-year vision identified in Greater Sydney. It contains the planning priorities and actions for implementing the Metropolis of Three Cities, at a district level and is a bridge between regional and local planning.

The Plan introduces several priorities of relevance including:

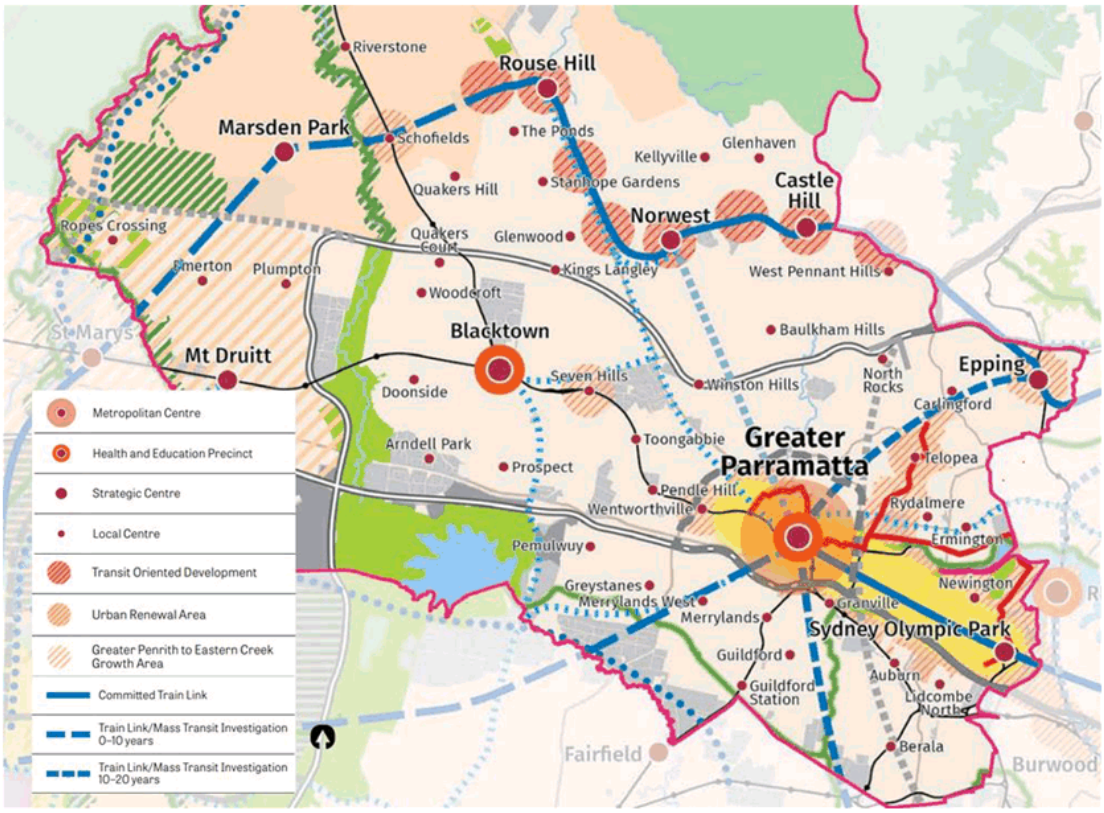
- Planning Priority C1 Planning for a city supported by infrastructure:
  - Prioritise infrastructure investments to support the vision of A Metropolis of Three Cities.
  - Sequence growth across the three cities to promote north-south and east-west connections.
  - Align forecast growth with infrastructure provision.
  - Sequence infrastructure provision using a place-based approach.
  - Maximise the utility of existing infrastructure assets and consider strategies to influence behaviour changes, to reduce the demand for new infrastructure, including supporting the development of adaptive and flexible regulations to allow decentralised utilities.
- Planning Priority C2 Working through collaboration:
  - Benefits of growth realised by collaboration of governments, community and business.
- Planning Priority C6 Creating and renewing great places and local centres, and respecting the District's heritage:
  - Using a place-based and collaborative approach throughout planning, design, development and management deliver great places by prioritising a people-friendly public realm and providing fine grain urban form, diverse land use mix, high amenity and walkability, in and within a 10-minute walk of centres.

- Planning Priority C9 Delivering integrated land use and transport planning and a 30-minute city:
  - Integrate land use and transport plans to deliver the 30-minute city.
  - Investigate, plan and protect future transport and infrastructure corridors.
  - Investigate and plan for the land use implications of potential long-term regional transport connections.
- Planning Priority C10 Growing investment, business opportunities and jobs in strategic centres:
  - Provide access to jobs, goods and services in centres by:
    - attracting significant investment and business activity in strategic centres to provide jobs growth
    - balancing the efficient movement of people and goods with supporting the liveability of places on the road network
  - Continue the review of planning controls for the Epping Town Centre in collaboration with State agencies.

Epping Town Centre represents an important Strategic Centre in the Central District Plan, with significant opportunities to create a great new place to live, work and visit.

The Central District is reproduced at Figure 3.1

Figure 3.1 – The Central District Plan



Source: The north district plan, accessed June 2023

3.2 Relevant Local Strategies and Plans

3.2.1 Local Strategic Planning Statement

The City of Parramatta Local Strategic Planning Statement (LSPS) outlines the 20-year vision for the local government area, to strategically help shape the City's future planning controls and infrastructure contributions plans. The LSPS is intended to harmonise the State Government's Greater Sydney Region Plan and Central City District Plan with the 2038 Community Strategic Plan.

The LSPS identifies Epping as both a Strategic Centre, defined as a centre that colocates a wide mix of land uses (commercial and residential) and have high levels of amenity, as well as a growth precinct.

Priority 4 of the LSPS details the intention to 'Focus housing and employment growth in the GPOP and Strategic Centres'. Notably Council policy direction and actions of this priority include:

- Focus high-rise development in Parramatta CBD and Strategic Centres (Epping and Sydney Olympic Park)
- Stage and sequence housing supply (location and yields) in Growth Precincts in line with infrastructure provision, including specific road and rail transport upgrades and provision, and not establish any new Growth Precinct
- Continue to progress Planning Proposals within Growth Precincts as per the staging plan in the City of Parramatta Local Housing Strategy (once endorsed by DPIE).

Priority 10 of the LSPS details the intention to 'Improve active walking and cycling infrastructure and access to public and shared transport'. Notably Council actions of this priority include:

- Identify typical public transport and door to door walk travel times from Planning Proposal sites to Employment Lands and Strategic Centres when assessing the merit of proposed housing densities.
- Investigate ways to implement and monitor Green Travel Plans to improve use of sustainable transport options.

Priority 11 of the LSPS details the insertion to Build the capacity of the Parramatta CBD, Strategic Centres, Local Centres and Employment Lands to be strong, competitive and productive'. Notably Council actions of this priority include:

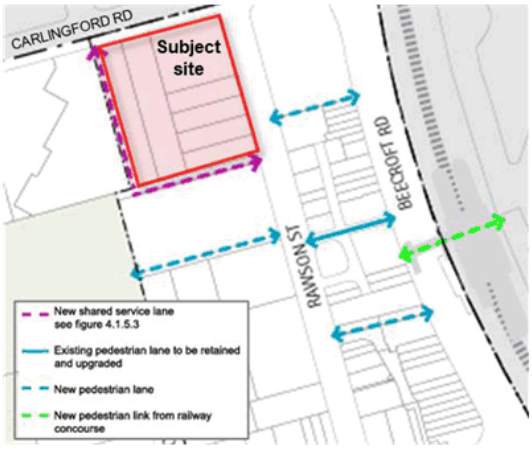
- Monitor commercial floor space in the Parramatta CBD, Sydney Olympic Park and Epping Strategic Centres and Westmead to document and understand historic trends as well as assisting in policy reviews and future forecasting
- Advocate for the recommendations of the Epping Town Centre Review (when completed) and implement the adopted recommendations.

3.2.2 Parramatta DCP 2011 – Epping Town Centre

Parramatta Council has detailed a strategy for the wider Epping Town Centre area. The area is made up of land to the west of Epping train station, bounded by Carlingford Road to the north, Kent Street to the west, Bridge Street to the south and Beecroft Road to the east. This aims to accommodate higher density commercial, retail and residential development in close proximity to the railway station.

The strategy includes guiding principles for future design and development outcomes the area. The key design item relating to development of the subject site is the requirement for a shared service lane to travel along the southern and western boundary of the site as shown in Figure 3.2 and Figure 3.3, connecting Rawson Street through to Carlingford Road.

Figure 3.2 – Epping Town Centre pedestrian connections and laneways (DCP 2011)



Source: Figure 4.1.5.3, Parramatta DCP 2011

Figure 3.3 – Epping Town Centre new vehicular laneways (DCP 2011)

Source: Figure 4.1.5.4 New vehicular laneway, Parramatta DCP 2011

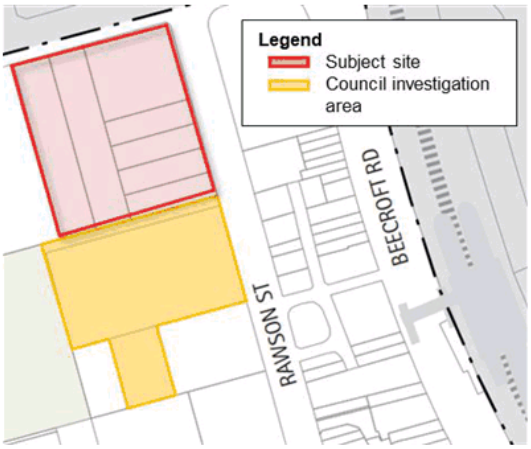
As shown, the lane on the western edge of the site is expected to be located entirely within the site with a varying road reserve of between 10 to 13 metres, whereas the lane on the southern edge of the site is expected to straddle the subject site and adjacent Council site with half of the 10 metre road reserve provided in each site. DCP 2011 indicates the laneway should be dedicated to Council.

DCP 2011 also notes:

- Shared basements are encouraged to minimise the number of vehicular crossings
- No new vehicular access points into a development site are permitted off Beecroft or Carlingford Roads. Any vehicular access required within Rawson Street should take into consideration the potential for shared basement access with adjoining sites
- Any site on the western side of Rawson Street, that has two street frontages, is not to be accessed off Rawson Street.

As it relates to broader planning within Epping Town Centre, DCP 2011 highlights Councils intention to investigate future options for the use of the Council owned car park site in Rawson Street, located along the southern boundary of the site, to determine the most appropriate future use of the site. This would be subject to a further Masterplan exercise and endorsement by City of Parramatta Council. The investigation area is shown in Figure 3.4 and Figure 3.5. Naturally any development will be required to accommodate the DCP 2011 service lane along its northern boundary as documented in Figure 3.2 and Figure 3.3.

Figure 3.4 – Council future investigation area (DCP 2011)



Source: Figure 4.1.5.2, Parramatta DCP 2011

Figure 3.5 – Council future investigation area (aerial imagery)

Base image source: Nearmap

3.3 Other Relevant Transport Studies

3.3.1 Epping Town Centre Study (Stantec, AECOM, 2014)

In November 2015, Stantec (formerly GTA Consultants) prepared a report for Oakstand documenting a review of potential future traffic conditions for the Epping Town Centre Study. At the same time, AECOM also prepared a traffic study for the redevelopment of Epping Town Centre for the Winten Lyon Group. Following receipt of separate submissions from Oakstand and the Winten Lyon Group Parramatta City Council (Council) prepared a Study Brief for a combined traffic impact study to be undertaken by Stantec and AECOM for both sites. The purpose of the joint traffic study was to provide a consistent approach on the assessment of potential future traffic conditions with different development scenarios for Epping Town Centre, including consideration of various land use and access scenarios.

Assumptions on development yields, traffic generation rates and trip reduction rates were submitted to Council and approved in July 2015. Following agreement on these matters, Stantec developed base models in LinSig for each scenario and conducted the assessment.

The assessment[5] involved a comparison of the network and intersection performance statistics of a number of land use scenarios and sub-options for the development, connectivity and road network improvements within Epping Town Centre. Key findings from the assessment include:

- The performance of the Epping Town Centre road network during peak hours is significantly influenced by the very high volumes of regional traffic passing through the Epping Road–Beecroft Road–Carlingford Road corridor. This

[5] Proposed Epping Town Centre Redevelopment, Rawson Street Epping, Traffic Study Issue A, GTA Consultants reviewed by AECOM, dated 24 November 2015

issue has been present in Epping for the last at least 20 years, with minimal traffic growth, if any, recorded during peak periods as discussed further in section 8.4.1.

- The development of Epping Town Centre under Council's DCP controls is forecast to generate approximately the same level of PM peak traffic (1,000 vehicles per hour) as currently experienced. This is because traffic generated by the proposed residential apartments would be offset by a reduction in commercial floor space.
- The overall performance of the network resulting from the various land use scenarios investigated, as indicated by average vehicle delays, fall within a relatively narrow range. This is mainly due to the situation in Epping Town Centre that the differences between the various land use scenarios become relatively minor in comparison with the very high volumes of regional traffic passing through during peak periods.

3.3.2 Epping Planning Review Traffic Analysis

Council note the following on their website:

"In March 2014, the Department of Planning and Environment introduced new planning controls for the Epping Town Centre study area completing their planned precinct process.

Since that time, a strong housing market has seen the Epping Town Centre experience unprecedented levels of redevelopment and growth. The development has raised community concern in relation to traffic congestion.

In May 2016, the council amalgamations process saw the Epping Town Centre fall entirely within the jurisdiction of the new City of Parramatta entity. This presented the opportunity to address critical issues and plan for the function of the centre for the next 20 years.

In December 2016, Council commenced the Epping Planning Review project to address these land use and traffic issues[6]."

The Epping Planning Review included undertaking technical studies to ascertain specific land use issues and traffic impacts, including commissioning the Epping Town Centre Traffic Study[7]. The study reviewed the traffic impact of a range of future land use and road network improvement scenarios through developing a series of existing and future year (2017, 2026 and 2036) mesoscopic travel demand and traffic flow/queuing models for the full study area road network. In addition to the Dynameq traffic model queuing analysis, the existing and future intersection performance and traffic delays at the six key traffic signal controlled intersections of the traffic model "core network" area were assessed in detail using the SIDRA 7 Linked Intersection model, for the existing 2017 and future year 2026 and 2036 am and pm traffic network models. The study found that the proposed land use growth scenarios will significantly impact future levels of traffic congestion on the major road network and hence further road network improvements and/ or changes to travel mode were required to accommodate the uplift in traffic.

After a review of this initial study, Transport for NSW have asked Council to undertake further work. There is no updated status on this work and given Transport for NSW commentary requested Council to modify the study, this assessment has not relied on information presented in the study.

[6] https://www.cityofparramatta.nsw.gov.au/vision/precinct-planning/epping-planning-review, accessed June 2023
[7] Epping Town Centre Traffic Study, EMM, 10 May 2018

4. Development Proposal

4.1 General Site Layout and Land Uses

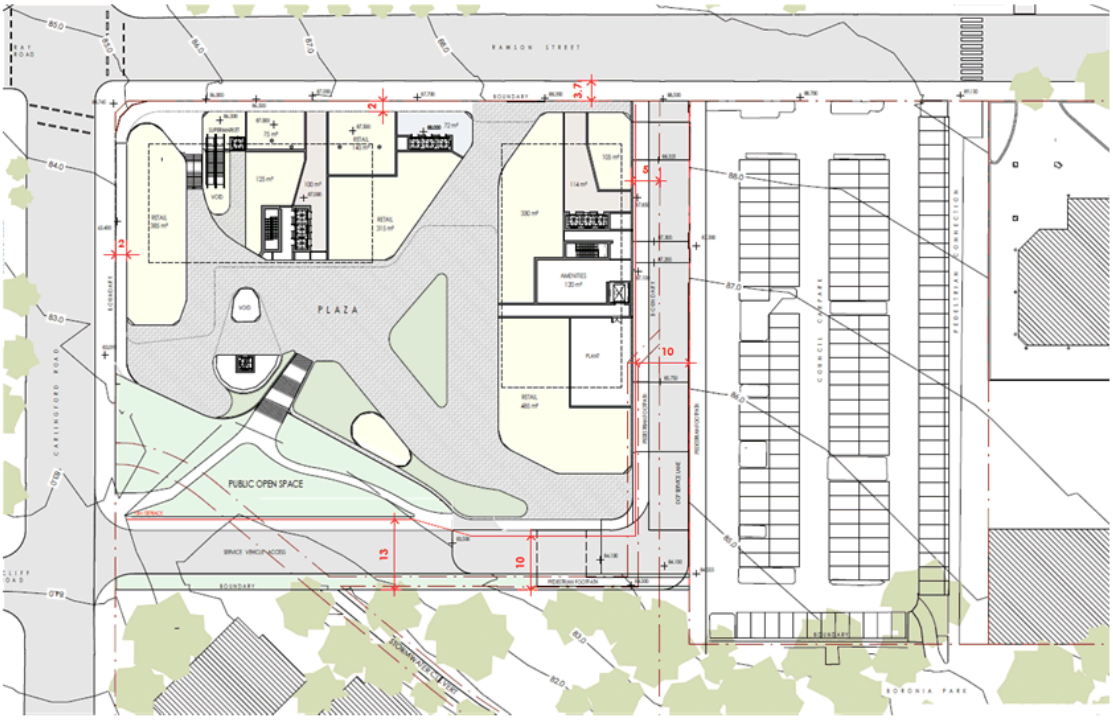
An indicative land use summary for the development proposal, which includes a range of land uses including residential, retail and commercial (office) is provided in Table 4.1.

Table 4.1: Development schedule

Land Use	Land Use Scale
Residential	420 units
Office	7,430 sqm GFA
Supermarket	3,100 sqm GLFA
Specialty Retail	3,147 sqm GLFA

The proposed layout of the development and configuration of buildings on the ground floor plane, and transport access is provided at Figure 4.1.

Figure 4.1: Proposed ground floor plan



Base image source: KANNFINCH

4.2 Transport Access and Car Parking

Rawson Street will continue to provide traffic and transport access to the subject site as part of the proposed development. A single consolidated driveway will be provided along the southern boundary of the site aligned with the DCP 2011 service lane requirement as detailed in Figure 3.2 and Figure 3.3. The driveway will form the primary vehicular access into the basement car park and loading dock.

In accordance with DCP 2011, the service lane could be extended along the western boundary of the site to Carlingford Road. As confirmed by the Flood Assessment Report prepared by GRC Hydro dated June 2023, the service lane is subject to flooding events and hence is not recommended for use by general vehicles. Notwithstanding, it is recommended the service lane is open for use by service vehicles to remove service vehicles from Rawson Street and

separate these movements from general vehicles accessing the basement car park and pedestrians travelling along Rawson Street, with controls in place to close the service lane during flooding events.

The proposal incorporates around 548 parking spaces over five basement levels. The car park will provide parking for residents, staff and visitors with access control (roller doors/ boom gates) to ensure secure access and separation of users.

The site access will be designed to accommodate the largest truck requiring access to the site; being a 12.5 metre HRV. Six bays are provided within the consolidated dock. A truck turntable in the centre of the loading dock is proposed which will provide adequate room for vehicle manoeuvres. As such, the loading dock will allow for vehicles to enter/ exit in a forward direction.

Details of bicycle parking provision have not been developed. It is recommended that a provision consistent with DCP 2011 expectations be provided, with an assessment of DCP requirements outlined in Section 7.1 of this report.

The development of the site as a whole has allowed for high-quality pedestrian experience with improved site permeability and pedestrian amenity ensured by way of expanded public domains on the ground floor, enhanced connectivity to the Rawson Street car park future development site, and strengthening desire lines to Epping Town Centre/ Railway Station.

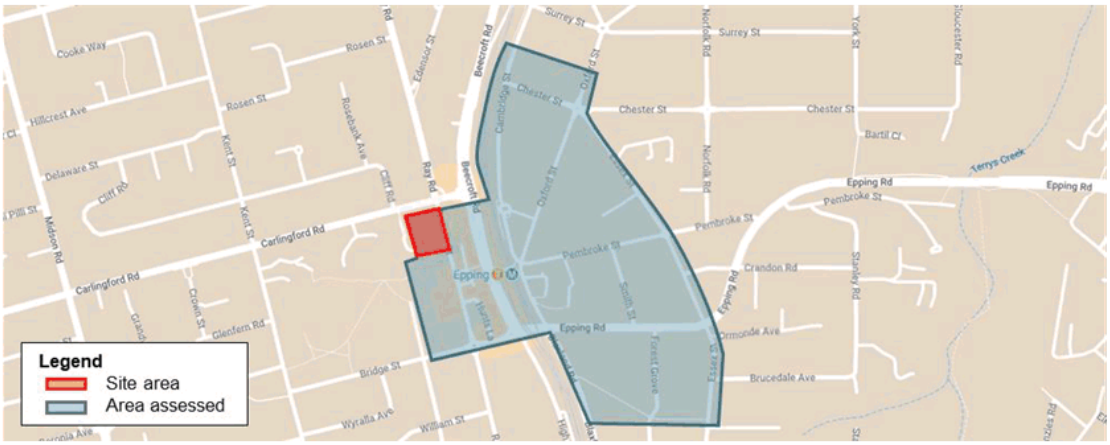
5. Trip Generation Assessment

5.1 Existing Travel Behaviour

Journey To Work (JTW) data has been sourced from the Australian Bureau of Statistics (ABS) 2016 census[8] and provides an idea of existing travel demand characteristics for the Statistical Area containing and surrounding the subject site in Epping. Greater Sydney was subject to COVID-19 lockdowns on 2021 Census night and hence the 2021 JTW data could not be considered typical, and 2016 data has been referenced for the purpose of this assessment. It is noted that the Sydney Metro north west, nor the previous train line that was superseded by the Metro, was not active during the 2016 census and hence any resultant changes to mode share are not reflected in the results.

Figure 5.1 details the catchment of census data analysed.

Figure 5.1 – Statistical area containing and surrounding the subject site in Epping [1]



Base map source: Google Mymaps, accessed June 2023

[1] Corresponds to the ABS 2016 Statistical Area 1 12601149530, 12601149502, 12601149503 for residents and generally corresponds to destination zone 114953446 and 114953447 for commuters

Table 5.1, Figure 5.2 and Figure 5.3 provide a summary of the existing main modes of transport residents and commuters in the surrounding area respectively take to get to work.

The 2016 Census data indicates that the majority of residents travel by train (57 per cent), with 32 per cent traveling by car and six per cent by bus. Four per cent of residents walked to work, with only 0.5 per cent cycling to work. The data also indicates that the majority of commuters travel by private car (65 per cent driver, four per cent passenger), with 22 per cent traveling by train and three per cent by bus. Almost six per cent of commuters walked to work, with only 0.5 per cent cycling to work. It is noted that the Tallawong – Chatswood Metro was not active in 2016 and hence any resultant changes to mode share are not reflected in the results.

Table 5.1: Existing JTW travel mode share to/ from Epping (2016 Census)

Mode	Mode Split	
	Residents (traveling from the precinct)	Commuters (traveling to the precinct)
Car, driver	30%	65%
Car, passenger	2%	4%
Train	57%	22%
Bus	6%	3%
Walk	4%	5.5%
Cycle	0.5%	0.5%
Other	0.5%	0%

[8] Greater Sydney was subject to COVID-19 lockdowns on 2021 Census night.As such, 2021 JTW data could not be considered typical, and 2016 data has been referenced

Figure 5.2 –Existing travel mode share from Epping (residents) – 2016 Census

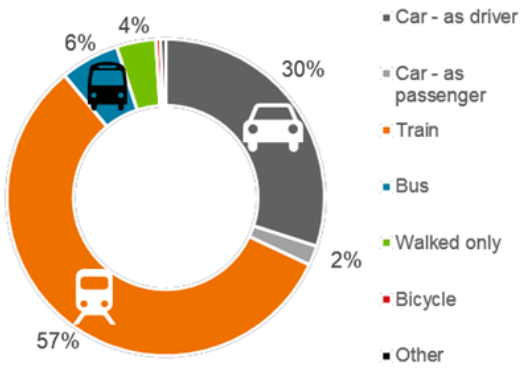


Figure 5.3 –Existing travel mode share to Epping (commuters) – 2016 Census

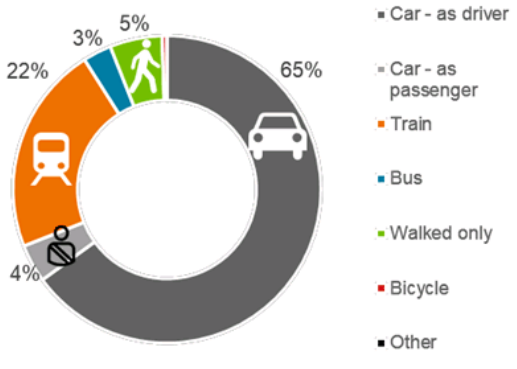


Figure 5.4 and Figure 5.5 illustrates the evolving travel behaviour change respectively for residents and commuters to/ from Epping between 2011 and 2016.

Figure 5.4 –Changing travel mode share from Epping (Residents) - 2011 to 2016 Census

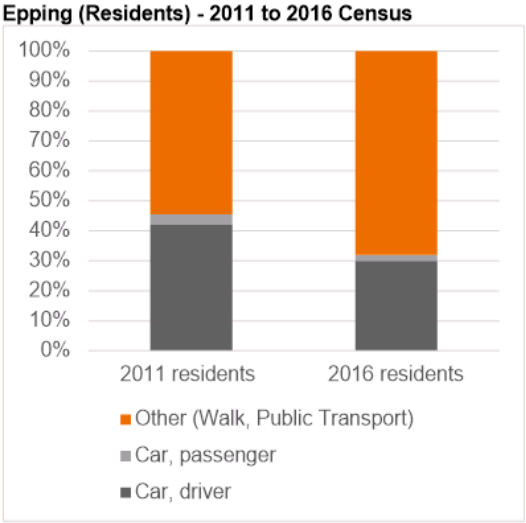


Figure 5.5 – Changing travel mode share from Epping (Commuters) - 2011 to 2016 Census

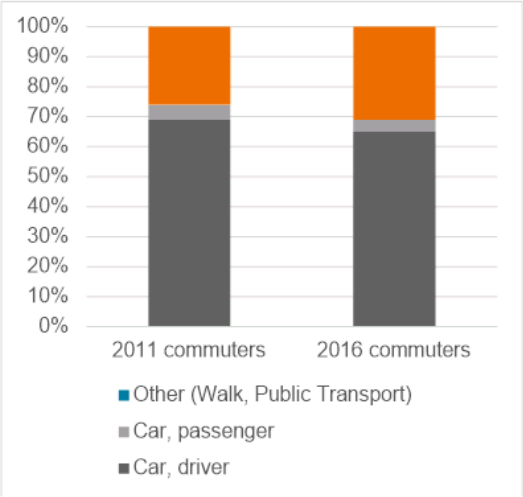


Figure 5.4 and Figure 5.5 respectively indicate private vehicle mode share (as driver or passenger) has reduced by 14 per cent for residents and five per cent for commuters over the five-year census period. Further reductions to private vehicle mode share are expected to have occurred following the opening of the Sydney Metro north west, noting the line was not active during the 2016 census[9], and further reductions are expected to occur following the extension of the metro line through the opening of the Sydney Metro city and south-west in 2024.

5.2 Travel Mode Share Targets

JTW has been used to develop mode split targets since it remains the most reliable data available. However, analysis of travel patterns from the Household Travel Survey, available only at a higher scale for Parramatta LGA, shows that peak hour car driver mode share, considering all trip purposes, could be higher than that of the JTW. Therefore, the mode split targets for residential land use when considering all trip purposes has been set based on the JTW. Naturally any Green Travel Plan prepared for the development and as discussed in Section 9, would target a reduction to car based travel for the purpose of commuter trips by residents living in the development.

[9] Greater Sydney was subject to COVID-19 lockdowns on 2021 Census night.As such, 2021 JTW data could not be considered typical, and 2016 data has been referenced

For commuters, a series of benchmark suburbs were identified to determine appropriate travel mode share targets for the site. Any Green Travel Plan prepared for the development and as discussed in Section 9, would further refine such targets, taking into consideration the changing transport environment and physical infrastructure provided on site. With this in mind, Section 6.1.1 identifies maximum parking requirements for commercial land use that would enforce a constrained parking environment for workers and therefore encourage further reductions to private vehicle mode share. As such, the mode split targets are considered suitability conservative for the assessment.

The mode split targets are summarised in Table 5.2.

Table 5.2: Future travel mode share to/ from Epping

Mode	Mode Split	
	Residents (considering all trip types)	Commuters (traveling to the precinct for work purposes)
Car, driver	30%	50%
Car, passenger	2%	4%
Train	57%	34%
Bus	6%	5%
Walking and Cycling	5%	7%

5.3 Trip Generation

The anticipated person trip generation associated with the development and corresponding generation by transport mode are summarised in Table 5.3. The person trip generation rates for each land use have been sourced from Roads and Maritime Services Technical Direction 2013/04a (TDT 2013/4a) for high-density residential, office and shopping centre uses.

Table 5.3: Person trip generation (network peak hours)

Land Use	Size	Person Trip Generation Rates		Person Trip Generation	
		AM Peak	PM Peak	AM Peak	PM Peak
Residential	420 units	0.67 trips per unit	0.56 trips per unit	281	235
Commercial	7,430 sqm GFA	2.49 trips per 100sqm	1.85 trips per 100sqm	185	137
Retail	6,247 sqm GLFA [1]	3.58 trips per 100sm GLFA	7.46 trips per 100sqm GLFA	179	373
Total				**645**	**745**

Table 5.3 indicates that the planning proposal is expected to generate approximately 645 and 745-person trips in the AM and PM peak hours respectively. Table 5.4 has been prepared to demonstrate the disaggregation of trip types across all modes of travel. For the purpose of this assessment, retail travel modes have been sourced from the Trip Generation and Parking Demand of Shopping Centres Analysis Report[10] that informs the TDT 2013/4a, using sites with similar transport settings to Epping.

[10] : Page 13, Trip Generation and Parking Demand of Shopping Centres, Analysis Report, Halcrow for the NSW Roads and Traffic Authority, September 2011

Table 5.4: Trip generation by transport mode

Travel Mode	Mode Split			Trips	
	Resident	Commuter	Retail	AM Peak	PM Peak
Vehicle, as driver	30%	65%	52%	320	402
Vehicle, as passenger	2%	4%	19%	56	99
Train	57%	22%	11%	226	216
Bus	6%	3%	7%	37	52
Walking and cycling	6%	7%	10%	51	70
Total				**690-person trips per hour**	**839-person trips per hour**

Table 5.4 indicates that trips by vehicle, as driver, would likely accounts for approximately 320 and 400 person trips in the AM and PM peak hours respectively. The assessment also indicates that some 210 to 230 trips and 35 to 50 trips will occur via train or bus respectively, with approximately 50 to 70 active travel trips.

Notwithstanding and as already discussed, further reductions to private vehicle mode share are expected within Epping Town Centre generally. The integrated land uses provided in the proposed development and across Epping Town Centre generally (existing, approved and future development) provide opportunities for co-location of jobs, housing and retail, providing opportunity to contain trips internally to Epping thereby minimising external traffic.

Any Green Travel Plan prepared for the development and as discussed in Section 9, would further refine mode share targets, taking into consideration the changing transport environment, physical infrastructure provided on site and actions to encourage behavioural change in residents, staff and visitors.

6. Parking and Loading Assessment

6.1 Car Parking Requirements

6.1.1 DCP 2011

The car parking requirements for different development types are set out in the Parramatta DCP 2011. Specific requirements for Epping Town Centre are outlined in Table 4.1.5.14.

A review of the car parking requirement rates for the proposed yields is provided in Table 6.1. It is noted that all rates are maximum rates, with exception of residential visitor which is a minimum parking rate.

Table 6.1: DCP 2011 car parking requirements

Land Use	Description	Size	Car Parking Rate	Car Parking Requirement
Residential	1 bedroom	120 units	Maximum 0.4 spaces per unit	48
	2 bedroom	240 units	Maximum 0.7 spaces per unit	168
	3 bedroom	60 units	Maximum 1.2 spaces per unit	72
			Sub-total	*288*
	Visitor	420 units	Minimum 1 space per 7 units	60
Non-Residential	Commercial	7,430sqm	Maximum 1 space per 50 sq.m GFA	149
	Retail	6,247sqm	Maximum 1 space per 30 sq.m GFA	208
Total				**705 spaces**

Based on the above, the proposed development is required to provide a minimum of 60 residential visitor spaces and a maximum of 288 residential, 208 retail and 149 commercial parking spaces, equating to a minimum of 60 residential visitor parking spaces and maximum of 645 parking spaces for the remaining land uses.

6.1.2 Adequacy of Parking Supply

The development proposes a total of 548 car parking spaces and therefore generally complies with Council's car parking requirements, with parking supply and allocation to be developed further as part of future planning applications.

As part of further planning stages, it is recommended a Resident or Green Travel Plan is prepared to minimise the reliance on single occupancy car journeys to and from the site. A Green Travel Plan is a package of measures aimed at promoting and encouraging sustainable travel and reducing reliance on the private car. This could consider features such as car share, reduced parking supply on site and end of trip bicycle facilities. An overview Green Travel Plan is provided in Section 9.

6.2 Other Parking Requirements

6.2.1 Accessible Parking

DCP 2011 requires one accessible space for every adaptable unit, and one to two per cent of non-residential parking supply to be accessible.

The accessible parking requirements would be determined as part of any future development application depending on the ultimate parking supply and provision of adaptable units.

6.2.2 Car Share Requirements

DCP 2011 requires one space to be allocated to car share for developments with 50 or more dwellings, and notes the following:

"If agreement with a car share provider is not obtained then the car share space is to be used for additional visitor parking until such time as a car share provider agreement is obtained."

As part of any future development application, a car share space would be provided within the basement car park, co-located with the residential visitor parking to ensure practical access by the public and to maintain on-site security.

6.2.3 Motorcycle Parking

The proposed development is also required to provide motorbike parking in accordance with DCP 2011, at a rate of one motorcycle parking space per 25 non-residential parking spaces.

The motorcycle parking requirements would be determined as part of any future development application depending on the ultimate parking supply.

6.3 Loading and Servicing Requirements

6.3.1 DCP 2011

DCP 2011 provides requirements for service vehicle parking for commercial land uses, and states that loading facilities for other land uses should be provided in accordance with the current Transport for NSW (former RTA) "Guide to Traffic Generating Developments 2002" (Transport for NSW Guide 2002).

Table 6.2 provides an assessment of minimum requirements as they relate to the proposal.

Table 6.2: Service vehicle parking requirements

Land Use	Size	Loading Rate	Source	Loading Requirement
Residential	420 units	4 plus one per 100 units over 200 units	Transport for NSW Guide 2002	6
Commercial	7,430 sqm	1 bay per 400m2 GFA	DCP 2011	19
Retail	6,247 sqm	5 plus 1 space per 1,000sqm GFA over 2,000sqm GFA	Transport for NSW Guide 2002	9
			Total	**34**

Table 6.2 indicates a total of 34 loading bays would be required for the development proposal. Notwithstanding, Stantec's experience with calculating loading requirements for new large-scale mixed-use developments has shown Transport for NSW Guide 2002 rates generally result in an excessive recommended loading dock provision given they have not been based on an empirical assessment of loading demands, having regard to the expected needs of the proposed land uses. An analysis has been undertaken, having regard to the frequency of existing loading events, to predict future loading requirements.

In this regard, an assessment of the loading requirements of the development is set out in the following sections.

6.3.2 TfNSW Urban Freight Forecasting Model

Stantec has analysed the TfNSW Urban Freight Forecasting Model to determine loading requirements for the proposed development. The model relies on the following inputs:

- number of floors
- commercial area
- residential area/ number of apartments
- retail area.

The proposal comprises two buildings and an average of 24 floors has been used for the purpose of the model.

The Urban Freight Forecasting Model indicates the need for eight loading spaces, broken down as follows:

- Five light vehicle spaces (cars, vans, utes)
- Two SRV spaces
- One MRV/ HRV spaces.

Six loading spaces are included in the basement comprising:

- Two residential bays accommodating light vehicles (cars, vans, utes)
- Two commercial bays accommodating vehicles up to and including 8.8m MRV's
- Two retail bays accommodating vehicles up to and including 12.5m HRV's.

TfNSW has therefore identified a deficiency in three light vehicle loading spaces (being cars, vans, utes etc.).

Notwithstanding, further review of the model indicates it is highly sensitive to retail land use. Removal of the 6,247 square metres of retail land use from the model indicates the residential/ commercial components of the development would generate a total demand for 66 daily loading events, and need to provide two loading spaces suitable to accommodate light vehicles only to service this demand.

This suggests that the retail land uses generates demand for around 200 daily loading events, and requires access to 13 loading spaces. Stantec has collated significant data on loading demands generated by supermarkets and based on a review of sites proximate to Epping[11], the supermarket, comprising more than 50 per cent of the retail area, would be expected to generate around 19 daily service events. This is naturally significantly less than suggested by the model. Further, the remaining specialty retail tenancies could not be expected to generate significant loading demands in the orders of magnitude as suggested by the Transport for NSW model.

With that in mind, a first principles assessment of loading demands has been completed in the following section.

6.3.3 Demand Assessment for Loading and Servicing Vehicles

A first principles assessment based on the expected demand has also been completed. Such an approach is routinely considered by stakeholders to be a more robust assessment and one that is better positioned to accurately reflect current (and changing) loading dock provision and efficiency.

Residential

The predominant form of ongoing deliveries to the residential apartments are likely to be in the form of supermarket and other e-commerce deliveries. It is noted that the site is well located for provision of these services in local retail and supermarket offerings. Further, each residential lobby includes a secure parcel room to accommodate such deliveries and any other delivery requirements when residents are not available. Stantec's research on the frequency of supermarket deliveries for residential apartments in CBD locations revealed no credible data sources. However, with the site located close to a number of nearby supermarkets, it is expected that on-line supermarket deliveries will be relatively infrequent, with traditional in-store and 'click and collect' purchases likely to be more convenient and thus common.

Notwithstanding, for the purposes of this assessment, Stantec has assumed that 10 per cent of residents' purchase groceries via a home delivery service each week. For 420 apartments, this equates to about 42 apartments generating one home delivery per week, representing about six home delivery services per day (on average). Assuming half of these home deliveries are either consolidated for the apartments within the site and/ or other deliveries for nearby apartments, it follows that about three additional home delivery vehicles may be generated by the residential apartments per day.

For e-commerce deliveries, Stantec has further assumed that 10 per cent of residents' generate an online delivery per day that arrive from separate providers such that packages are not consolidated (this represents an arbitrary and conservative assumption). In addition, the average residential apartment turnover rate is approximately 0.5 per cent of all apartments in any given week. Conservatively assuming a rate of 0.7 per cent to account for seasonal variations and given the proposed 420 apartments, there would be an average of three apartments moving in or out in any given week.

Overall, this assessment suggests that around up to 45 short stay loading events per day could be generated by deliveries for the residential apartments. With an additional one long stay loading event for removalist trucks, this would be by rigid trucks up to 8.8m long MRVs. As such a minimum of one loading bay is recommended, with provision for intermittent use of a second. Waste collection for the residential apartments is likely to require four garbage trucks per week.

Office

Loading docks play an important role for the function of most commercial spaces. In the case of office space, it is typically acknowledged that one loading space for every 10,000 to 15,000 square metres of GFA is appropriate. This approach is consistent with TfNSW data. Table 6.3 highlights the few examples with commercial space located in North Sydney, Sydney Olympic Park and Parramatta.

Table 6.3: TfNSW data for similar commercial buildings in Sydney

	North Sydney	Sydney Olympic Park	Parramatta	Average
Size (GFA)	31,400m2	34,131m2	27,000m2	30,844m2
Loading bays	1	7	3	3.7

[11] [11] Based on a review of loading demands collected at 11 supermarket sites including Frenches Forest, St Ives, Lane Cove, Neutral Bay, Carlingford, Macquarie, Chatswood, Northbridge, Thornleigh, Hornsby and Beecroft

	North Sydney	Sydney Olympic Park	Parramatta	Average
Loading bays pe 10,000sqm	0.03	0.21	0.11	0.12

Based on the above, with the proposed 7,430 square metres of office space, access to one loading bay would be sufficient to cater for the demands of the commercial floor space.

Further, drawing on commercial loading dock data compiled by Arup[12] from sites within Sydney CBD, the commercial use is expected to generate around one vehicle movements per 10,000 square metres of GFA in the peak hour. Assuming a peak to daily ratio of around 10 per cent, the commercial use could be expected to generate around six deliveries per day.

Retail (Speciality)

Loading requirements for retail space are typically influenced by the number of retail tenancies and their individual needs. Drawing on Stantec's database and experience with similar projects/ sites, a general rule is 1.1 deliveries per day for each general retail tenancy while mini majors generate demand for up to 3.1 deliveries per day.

With the plans indicating eight retail tenancies on the ground and one retail tenancy and mini major on the lower ground floor, the loading demands of the retail space are expected to be up to 13 vehicles per day. Conservatively applying a 50 per cent contingency this results in about 20 vehicles per day.

The specialty retail uses therefore require use of one loading bay.

Retail (Supermarket)

Drawing on Stantec's database and experience with similar projects/ sites, the supermarket is expected to generate demand for around 19 deliveries per day[13]. Provision of two loading bays provides appropriate contingency to accommodate smaller deliveries from minor suppliers at the same time as major deliveries requiring longer dwell times from distribution centres.

Summary

In summary, the following shared loading requirements are required for each of the proposed land uses:

- Residential: use of up to two loading bays for vehicles up to MRVs
- Office: use of one loading bay for vehicles up to MRVs
- Retail (speciality): use of one loading bay for vehicles up to MRVs
- Retail (supermarket): use of two loading bays for vehicles up to HRVs.

Overall, the proposal is estimated to require use of six dedicated loading bays to accommodate a demand for around 91 vehicle movements per day.

6.3.4 Adequacy of Supply

In this regard, the provision of six loading bays in the basement loading dock is considered to be sufficient for the development. A loading dock management plan will be prepared prior to Occupation and the use of the loading dock is to be administered/ monitored by the building manager to ensure capacity of the loading dock is not exceeded at any time.

Waste collection is proposed to occur within the loading dock via Council collection for the residential land uses and private contractor collection for the commercial and retail land uses.

6.4 Design Review

6.4.1 Car Park Layout

The car parking layout design would be progressed through future design stages to meet the requirements of the Australian Standard for Off Street Car Parking (AS2890.1:2020 and AS2890.6:2022), the Australian Standard for Off Street Commercial Vehicle Facilities (AS2890.2:2018) and DCP 2011 to operate satisfactorily with ramp grades, height clearances, aisle widths and car space dimensions. Design of the car parking areas would be assessed as part of any future development application.

[12] Loading docks and building servicing, an evidence-based approach, 2018 AITPM Conference Presentation, Josh Milston, ARUP
[13] Based on a review of loading demands collected at 11 supermarket sites including Frenches Forest, St Ives, Lane Cove, Neutral Bay, Carlingford, Macquarie, Chatswood, Northbridge, Thornleigh, Hornsby and Beecroft

The car parking levels would provide for resident parking, with separate security doors and/ or boom gates ensuring secure access at all times.

6.4.2 Loading Dock

The loading dock access driveway would need to be designed in accordance with Australian Standard (AS2890.2:2002) for access by service vehicles up to 8.8m medium rigid trucks, 12.5m large rigid vehicles and 10-11m long garbage trucks.

There will also be adequate manoeuvring areas, including provision of an on-site turntable within the loading dock, to allow all vehicles to enter and exit in a forward direction. Any access control points at the car park access will need to consider loading and delivery access.

It is expected that the design of the loading area and travel paths from the car park access (including height clearance) will achieve compliance with relevant Australian Standards and DCP requirements. Detailed assessments would be included as part of any future development application.

6.4.3 Vehicle Access

During early design development, the vehicle access strategy sought access from both Rawson Street and Carlingford Road via the DCP 2011 service lane as detailed in Figure 3.2 and Figure 3.3. Flood modelling completed for the project, as detailed in the Flood Assessment Report[14], indicated that the service lane along the western edge of the site near Carlingford Road is subject to flood events and hence it would not be appropriate to permit general vehicle access along this extent of the service lane.

As such, the design currently allows for a single consolidated driveway along the southern boundary of the site aligned with the DCP 2011 service lane. The driveway will form the primary vehicular access into the basement car park and loading dock, and results in the reduction of two vehicular crossovers along Rawson Street, significantly improving the pedestrian environment. All vehicles would enter and exit the site access in a forward direction under normal road conditions with good sightlines provided in either direction on approach and egress.

Notwithstanding, it is recommended the service lane is extended to Carlingford Road and developed as the primary vehicular access for service vehicles only into the loading dock. This would allow for the separation of service and private vehicle movements accessing the basement, reduce the prevalence of service vehicles traveling through Epping Town Centre along Rawson Street, and remove the interaction of service vehicles with pedestrian activity at the site access along Rawson Street. During flood events, controls could be implemented including through use of boom gates to close the Carlingford Road access, with service vehicles directed to use the Rawson Street access instead.

[14] Epping Town Centre, Flood Assessment for Planning Proposal, GRC Hydro, June 2023

7. Sustainable Transport Infrastructure

7.1 Bicycle End-of-Trip Facilities

Bicycle parking for the site should be provided in accordance with the requirements of DCP 2011, as summarised in Table 7.1.

Table 7.1: Bicycle parking requirements

Use	Size/ No.	Bicycle Parking Rate	Bicycle Parking Requirement
Residential	420 units	1 space per dwelling	420 spaces
		1 visitor space per 10 dwellings	42 visitor spaces
Commercial and retail	13,677 sqm	1 space per 200sqm GFA	68 spaces

Table 7.1 indicates that based on the indicative yield, any future development at the site should provide 420 bicycle parking spaces for residents, 42 bicycle parking spaces for residential visitors and 68 bicycle parking spaces for retail/ commercial staff and visitors. Bicycle parking provisions would be refined as part of any future Development Application.

Bicycle parking spaces, as a minimum, need to be designed in accordance with relevant Australian Standard (AS2890.3 Bicycle Parking Facilities) and DCP 2011. It is recommended that bicycle hoops/ racks be provided on the ground floor in the public domain for convenient bicycle parking adjacent to retail offerings, and to provide an alternative for visitors that does not involve navigating the basement. In accordance with DCP 2011, secure bicycle spaces for tenants can be provided individually (per tenancy) or collectively for the use of all tenants within a designated area.

DCP 2011 does not specify end of trip requirements for developments. Notwithstanding, it is recommended that at least one shower and change room facility is provided for staff per land use generating employment on-site.

7.2 Sustainable Transport

A key strategic merit of the development is the opportunity to promote sustainable travel given the high-density mixed-use nature of the development within a strategic centre; and within 200 metres of a rail and bus interchange that provides convenient access to local and regional residential, commuter, retail and recreational centres.

The development of the site as a whole has allowed for high-quality pedestrian experience with improved site permeability and pedestrian amenity ensured by way of expanded public domains on the ground floor, enhanced connectivity to the Rawson Street car park future development site, and strengthening desire lines to Epping Town Centre/ Railway Station.

In addition, the integrated land uses provided across Epping Town Centre generally (existing, approved and future development) provide opportunities for co-location of jobs, housing and retail, providing opportunity to contain trips internally to Epping thereby minimising external traffic and encouraging utilisation of public transport services in and out of Epping Town Centre across the day.

8. Traffic Impact Assessment

8.1 Overview

Intersection capacity analysis has been conducted at key intersections near the site to assess the traffic implications of the development, considering the cumulative impact of both approved and potential development in the Epping Town Centre area. The modelling scenarios are detailed in Table 8.1.

Table 8.1 – Scenario analysis for modelling traffic impacts

No.	Scenario	Description
1	Existing Condition	2023 traffic surveys
2	Post Development Condition	Scenario 1 including allowance for redevelopment
3	Future Base Condition with Epping Town Centre Background Traffic Growth	Scenario 1 including allowance for uplift of development throughout Epping Town Centre generally
4	Future Post Development Condition with Epping Town Centre Background Traffic Growth	Scenario 3 including allowance for redevelopment

8.2 Traffic Generation

8.2.1 Traffic Generation Rates

Overview

The traffic generation rates proposed to be adopted are summarised at Table 8.2, noting that the tabulated values have previously been agreed with both Transport for NSW and Council as detailed in correspondence received in Appendix A, with exception of the specialty retail rate.

Table 8.2: Agreed Trip Generation Rates

Land Use	AM Peak Traffic Rate	PM Peak Traffic Rate
Residential	0.19 per unit	0.15 per unit
Retail – supermarket	4.5 per 100m2 GLFA	13.5 per 100m2 GLFA
Retail – specialty	1.3 per 100m2 GLFA	4.0 per 100m2 GLFA
Commercial	1.03 per 100m2 GFA	0.84 per 100m2 GFA

Retail

As detailed in Appendix A, Transport for NSW have requested the development adopts a combined traffic generation rate for the retail assets, being supermarket and specialty retail, based on rates detailed in the Small Suburban Shopping Centres Analysis report ("Analysis Report") prepared by Bitzios on behalf of Transport for NSW dated 7 November 2018.

A detailed review of the retail rates as set out in the Analysis Report is provided in Appendix B. Based on this review, Stantec found the following:

- majority of the sites are set in a different transport and land use environment when compared to the development site in Epping Town Centre, noting a key criteria for the selection of sites surveyed as part of the Small Suburban Shopping Centres Analysis was the ease in isolating the site from other developments (other businesses outside the shopping centre). This resulted in:
  - majority of the developments were located proximate to low density residential land uses
  - majority of developments were located with limited or restricted co-location of other retail / commercial developments
  - majority of developments had significantly less public transport accessibility than Epping Town Centre is afforded.
- the traffic generation rates have been derived based on the site peak hour rather than the surrounding road network peak hour. Section 3.2.2 of the Guide to Traffic Generating Developments (Transport for NSW, 2002) states that the traffic generation for the peak activity time of the adjacent road network is possibly more important period [than the peak activity time of the development itself] as it is used to assess the effect of the development on the road system.

As such, the traffic generation rates are not considered comparable to characteristics expected in Epping Town Centre during the road network peak hours and hence the assessment has adopted retail rates as documented in Table 8.2.

8.2.2 Service Vehicle Traffic Generation

Further to the above, Council has requested the assessment considers service vehicle trip generation. In estimating the anticipated loading demand of the proposed retail / commercial uses, reference has been made to outcomes in Section 6.3. Table 8.3 has been prepared to summarise the anticipated traffic generation from loading demand for each use.

Table 8.3: Service Vehicle Traffic Generation

Land Use	Land Use Scale	Daily Rate [1]	Proportion During Peak periods		Traffic Generation (vehs) [2]					
					AM Peak			PM Peak		
			AM Peak Hour	PM Peak Hour	In	Out	Total	In	Out	Total
Residential	420 units	46	7%	5%	3	3	6	2	2	4
Office	7,430 sqm GFA	6	10%	0%	1	1	2	0	0	0
Supermarket	3,100 sqm GLFA	19	10%	0%	2	2	4	0	0	0
Specialty Retail	3,147 sqm GLFA [3]	20	10%	0%	2	2	4	0	0	0
Total					**8**	**8**	**16**	**0**	**0**	**4**

[1] Discussion on source of data / rate provided in Section 6.3.
[2] Each vehicle trip represents two vehicle movements, one inbound and one outbound
[3] Specialty retail GLFA assumed to equate to 80 per cent GFA, or 2,344 sqm GLFA, in accordance with Small Suburban Shopping Centres Analysis report ("Analysis Report") prepared by Bitzios on behalf of Transport for NSW dated 7 November 2018

Table 8.3 identifies that the proposed development could be expected to generate in the order of eight and two service vehicles, or 16 and four vehicle movements, respectively in the AM and PM peak hours. It is critical to note that these will comprise a variety of vehicles including primarily cars/ vans/ utes for residential/ office uses and a mix of vans/ utes and trucks for retail uses. For the purpose of this assessment, all service vehicles are assumed to be light vehicles, with exception of two heavy vehicles for retail uses.

8.2.3 Traffic Generation Reduction Factors

A number of discount factors were adopted to reduce the traffic generation potential of the development. These comprise: trip containment and passing trade.

Trip Containment

The proposed land use mix within the development reflects a sizeable residential base that would contribute towards walk trips to/from retail and commercial developments within a 400-metre radius area.

This will be facilitated with urban design and public domain features that enhance the walking environment. These reflect opportunities for trip containment, and the total trip generation of retail and commercial developments in the town centre could be reduced.

It was agreed between Transport for NSW, Council and Stantec that discount rates of 20 per cent of peak period retail trips and 10 per cent of peak period commercial trips be applied to the traffic generation of the town centre reflect these opportunities.

Passing Trade

The Transport for NSW Guide 2002 suggests retail trip discounts of up to 25 per cent for GLFAs less than 10,000 square metres, decreasing to 15 per cent for GLFAs over 30,000 square metres, to account for the incidence of linked and multi-purpose trips. Given the land use mix proposed, it has been estimated that approximately 25 per cent of retail trips are made by vehicles already passing by on the Carlingford Road-Beecroft Road-Epping Road corridor. These trips are included in the total generation but are not "new" trips on the road network; they are simply diverted from the passing traffic into the development and back out.

The analysis for the proposed retail areas for the development would also likely reflect this. It was agreed between Transport for NSW, Council and Stantec that a 25 per cent passing trade discount be applied for traffic on the Carlingford Road-Beecroft Road-Epping Road route.

8.2.4 Directional Splits

The assignment of traffic (i.e., the ratio between the inbound and outbound traffic movements) is detailed in Table 8.4. These are considered to be consistent with typical travel behaviour in Sydney.

Table 8.4: Agreed Peak Hour Inbound/Outbound Movement Proportions

Land Use	AM peak	PM peak
Residential	20% inbound, 80% inbound	80% outbound, 20% outbound
Retail	50% inbound, 50% inbound	50% outbound, 50% outbound
Commercial	90% inbound, 10% inbound	10% outbound, 90% outbound

8.2.5 Post Development Summary

Based on the above commentary, the traffic generation for the proposed development is set out in Table 8.5.

Table 8.5: Traffic generation [1]

Land Use	Land Use Scale	Trip Containment	Type	In/ out Movement Proportion				Traffic Generation (veh movements)					
				AM Peak Hour		PM Peak Hour		AM Peak Hour			PM Peak Hour		
				In	Out	In	Out	In	Out	Total	In	Out	Total
Residential	420 units	0%	Car	20%	80%	80%	20%	16	64	**80**	50	13	63
Office	7,430 sqm GFA	10%		90%	10%	10%	90%	62	7	**69**	6	51	57
Supermarket	3,100 sqm GLFA	20%		50%	50%	50%	50%	56	56	**112**	167	167	334
Specialty Retail	3,147 sqm GLFA [2]	20%		50%	50%	50%	50%	16	16	**32**	50	50	100
Residential	420 units	0%	Service Vehicle	50%	50%	50%	50%	3	3	**6**	2	2	4
Office	7,430 sqm GFA	0%		50%	50%	50%	50%	1	1	**2**	0	0	0
Supermarket	3,100 sqm GLFA	0%		50%	50%	50%	50%	2	2	**4**	0	0	0
Specialty Retail	3,147 sqm GLFA [2]	0%		50%	50%	50%	50%	2	2	**4**	0	0	0
Total								**158**	**151**	**309**	**275**	**283**	**558**

[1] Includes trip containment discount however does not include trip passing trade discount, as this is applied in traffic distribution
[2] Specialty retail GLFA assumed to equate to 80 per cent GFA, or 2,344 sqm GLFA, in accordance with Small Suburban Shopping Centres Analysis report ("Analysis Report") prepared by Bitzios on behalf of Transport for NSW dated 7 November 2018

Table 8.5 identifies that the proposed development could be expected to generate in the order of 309 and 559 vehicle trips respectively in the AM and PM peak hours. When considering that 25 per cent of retail traffic is passing trade and hence while they are included in the total generation, they are not "new" trips on the road network, the development actually results in 273 and 450 vehicle trips respectively in the AM and PM peak hours.

8.2.6 Existing Development Summary

The site currently houses a commercial office building and supermarket that are planned to be demolished as part of this development. An assessment of existing traffic generation based on the design rate (considering GFA) and the surveyed rate has been completed.

Surveyed Rate

The survey results indicate that the commercial site currently generates approximately one and nine vehicle movements in the AM and PM peak hours, respectively, and supermarket generates approximately 37 and 115 vehicle movements. The low commercial rates are partially a result of existing occupancies and low occupancy of parking spaces, with only 24 parking spaces leased at the building.

Further, a significant proportion of existing patrons to the coles site currently park in the adjacent Rawson Street car park rather than the coles undercroft car park. As such, the existing traffic volumes observed at the site access driveways are considered to underrepresent the actual traffic generated. By way of comparison, the Rawson Street car park currently generates 133 (80 enter, 53 exit) and 394 (199 enter, 195 exit) vehicle movements in the AM and PM peak periods, respectively.

Design Rate

Table 8.6 has been prepared to summarise the anticipated traffic generation and loading demand for each existing use on site based on traffic generation rates set out in Section 8.2.1 to 8.2.5. This provides a "like for like" comparison of traffic generating characteristics of the existing site with indicative development plans.

Table 8.6: Traffic generation [1]

Land Use	Land Use Scale	Trip Containment	Type	In/ out Movement Proportion				Traffic Generation (veh movements)					
				AM Peak Hour		PM Peak Hour		AM Peak Hour			PM Peak Hour		
				In	Out	In	Out	In	Out	Total	In	Out	Total
Office	4,296sqm	10%	Car	90%	10%	10%	90%	36	4	40	3	29	32
Supermarket	3,300sqm	20%		50%	50%	50%	50%	59	59	119	178	178	356
Retail	991sqm	20%		50%	50%	50%	50%	5	5	10	16	16	32
Office	4,296sqm	0%	Service Vehicle	50%	50%	50%	50%	1	1	2	0	0	0
Supermarket	3,300sqm	0%		50%	50%	50%	50%	2	2	4	0	0	0
Retail	991sqm	0%		50%	50%	50%	50%	1	1	2	0	0	0
Total								**104**	**73**	**177**	**197**	**223**	**421**

[3] Includes trip containment discount however does not include trip passing trade discount, as this is applied in traffic distribution

Table 8.6 identifies that the existing land use on site could be expected to generate in the order of 177 and 421 vehicle trips respectively in the AM and PM peak hour, including eight and zero service vehicle movements in the AM and PM peak hours respectively.

8.2.7 Traffic Uplift

Based on the above, the net increase in traffic generation based on design rates is detailed in Table 8.7.

Table 8.7: Traffic generation – net increase based on design rates

Scenario	Type	Land Use	Traffic Generation		New Trips		Passer By Trips	
			AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Proposed Development	Car	Residential	80	63	80	63	0	0
		Office	69	56	69	56	0	0
		Supermarket	112	335	84	251	28	84
		Retail	33	101	25	76	8	25
	Service Vehicle	All	16	4	16	4	0	0
	Total		**309**	**559**	**273**	**450**	**36**	**109**
Existing Development	Car	Office	40	32	40	32	0	0
		Supermarket	119	356	89	267	30	89
		Retail	10	32	8	24	3	8
	Service Vehicle	Supermarket	8	0	8	0	0	0
	Total		**177**	**421**	**145**	**324**	**32**	**97**
Traffic Uplift			**132**	**138**	**128**	**126**	**4**	**12**

As such, the proposed redevelopment will have a net increase in vehicle generation of around **132 and 138** vehicle trips respectively in the weekday AM and PM peak periods. When considering that 25 per cent of retail traffic is passing trade and hence while they are included in the total generation, they are not "new" trips on the road network, the development actually results in an uplift of **128 and 126** new vehicle trips respectively in the AM and PM peak hours.

Notwithstanding, for the purpose of this assessment, the uplift of traffic generated by the development is based on the following:

- the existing surveyed traffic volumes for the office land use has been removed from the background traffic, with new traffic (including loading) generated by the office superimposed

- all specialty retail and residential traffic (including loading) considered as new
- a minor uplift in traffic generated by the supermarket based on the design rate, noting the existing surveyed rate could not be established due to mix of existing traffic using both the on site and adjacent Council car park.

Based on the above, the net increase in traffic generated by the site as conservatively assessed in the SIDRA model is detailed in Table 8.8.

Table 8.8: Traffic generation – net increase based on surveyed rates as adopted in SIDRA model

Scenario	Type	Land Use	Traffic Generation		New Trips		Passer By Trips	
			AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Proposed Development	Car	Residential	80	63	80	63	0	0
		Office	69	56	69	56	0	0
		Supermarket	112	335	84	251	28	84
		Retail	33	101	25	76	8	25
	Service Vehicle	All	16	4	16	4	0	0
	Total		**309**	**559**	**273**	**450**	**36**	**109**
Existing Development	Car	Office/ specialty retail	1	9	1	9	0	0
		Supermarket	119	356	89	267	30	89
	Service Vehicle	Supermarket	4	0	4	0	0	0
	Total		**124**	**365**	**94**	**276**	**30**	**89**
Traffic Uplift			**185**	**193**	**179**	**173**	**6**	**20**

As such, for the purpose of the traffic assessment, the proposed redevelopment has been assessed based on having a net increase in vehicle generation of around **185 and 193** vehicle trips respectively in the weekday AM and PM peak hours. 25 per cent of the retail traffic is assessed as passing trade, with the remainder assessed as "new" trips on the road network, resulting in **179 and 173** new vehicle trips respectively in the AM and PM peak hours.

8.3 Distribution and Assignment

The directional distribution and assignment of traffic generated will be influenced by a number of factors, including the:

- configuration of the arterial road network in the immediate vicinity of the site
- existing operation of intersections providing access between the local and arterial road network
- surrounding employment centres, retail centres and schools in relation to the site
- likely distribution of staff residences in relation to the site
- configuration of access points to the site

Traffic associated with the development are distributed across the network by drawing on data collected from the ABS 2016 Census, including a review of where residents in Statistical Area 2 of Epping – North Epping that drive to work are commuting too at a Statistical Level 4, and where commuters working in Epping – North Epping that drive to work are commuting from at a Statistical Level 4. Key locations residents and commuters that drive to work either work or live include Ryde (34 per cent), Parramatta (19 per cent), North Sydney and Hornsby (12 per cent), Baulkham Hills (10 per cent) and Blacktown (five per cent). Further consideration has been given to the overall distribution of traffic patterns along Rawson Street, generated by the site and adjacent Council car park.

Having consideration to the above and for the purposes of estimating vehicle movements, the following directional distributions have been assumed for residents/ employees visiting the site:

- Beecroft Road South – 38 per cent
- Carlingford Road West – 29 per cent
- Beecroft Road North – 15 per cent (including a proportion that travel via Ray Road to access Beecroft Road at Kandy Avenue)
- Bridge Road South - 10 per cent
- Bridge Street west – 5 per cent
- Ray Road North – 3 per cent.

Visitors driving to the retail assets primarily including the supermarket and excluding "passing trade" trips, are typically arriving from a localised catchment. As such, distribution has been estimated based on existing travel patterns arriving/ departing Epping Town Centre generally. Further, the distribution of traffic at the site access point has been based on the existing distribution of traffic entering / exiting the site and adjacent Rawson street car park in both peak periods as follows:

- AM Peak:
  - Arrive: 68 per cent from south, 32 per cent from north
  - Depart: 36 per cent to south, 64 per cent to north
- PM Peak:
  - Arrive: 65 per cent from south, 35 per cent from north
  - Depart: 22 per cent to south, 78 per cent to north.

It is expected that a higher proportion of vehicles turn left out of the site and Council car park generally, and particularly in the PM peak, to avoid delays traveling south created by the high pedestrian volumes traveling over the midblock pedestrian crossing just south of the Council car park.

Based on the above, the estimated increase in turning movements near the subject site following development in the AM and PM peak hours are summarised at Appendix D.

8.4 Background Traffic Growth

8.4.1 Regional Traffic Growth

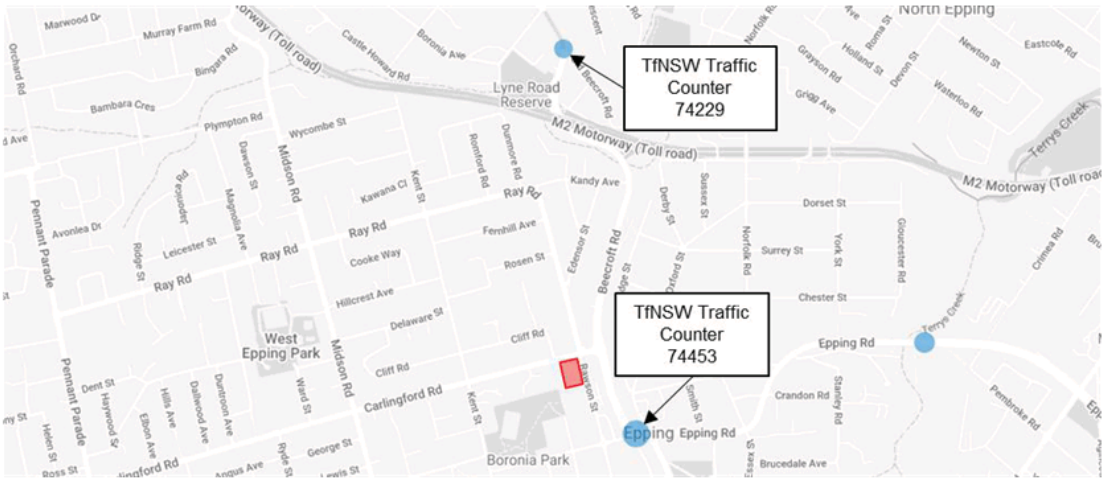
Overview

When undertaking a traffic and transport assessment of a new development proposal, it is normal to consider a future scenario that considers regional and other traffic growth and the ultimate functioning for the transport network. Stantec are proposing a departure from this approach given the capacity constraints of the Epping Town Centre road network, with relevant evidence set out in this section.

Historical Traffic Growth

Transport for NSW traffic volume viewer count stations along Beecroft Road and Epping Road shows that background traffic volumes have had no discernible growth for more than a decade. The location of each counter is illustrated in Figure 8.1, with respective AM and PM peak hour traffic volumes illustrated at Figure 8.2 and Figure 8.3 for Beecroft Road and Figure 8.4 and Figure 8.5 for Epping Road.

Figure 8.1 – Location of permanent traffic counters



Source: Transport for NSW Traffic Volume Viewer, accessed June 2023

Figure 8.2 – Beecroft Road AM Peak (Traffic Counter 74229)

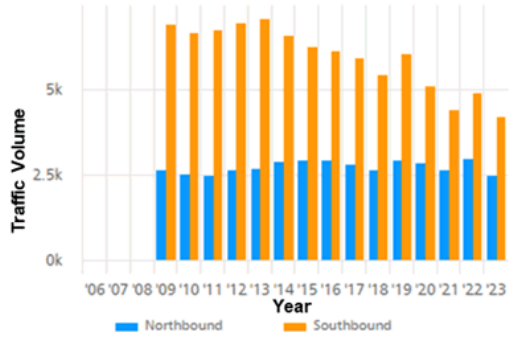


Figure 8.3 – Beecroft Road PM Peak (Traffic Counter 74229)

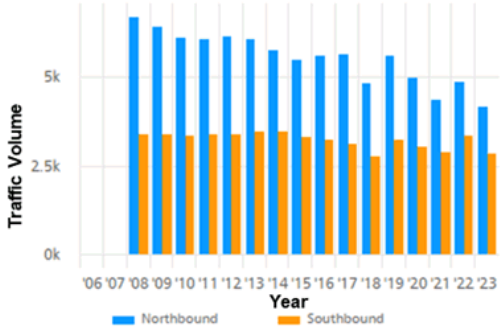


Figure 8.4 – Epping Road AM Peak (Traffic Counter 74453)

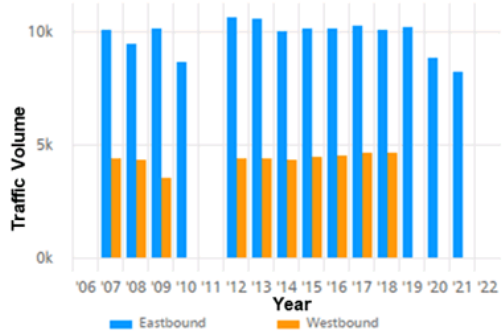


Figure 8.5 – Epping Road PM Peak (Traffic Counter 74453)

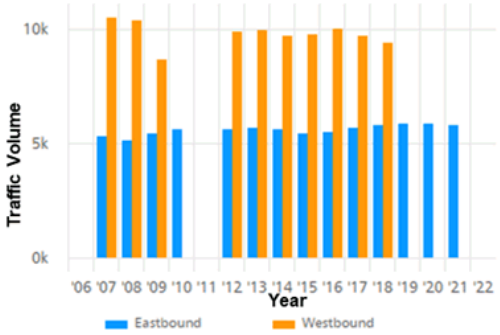


Figure 8.2 and Figure 8.3 for Beecroft Road and Figure 8.4 and Figure 8.5 for Epping Road indicates that the 10 year traffic growth has been negligible or declined.

Given Epping Town Centre has experienced a significant uplift in development over this period, it is evident that the capacity constraints of the key intersections in Epping Town Centre have displaced through traffic to other regional routes to accommodate newly generated traffic within the centre. This is not unlike other capacity restrained centre in Sydney metropolitan area such as Chatswood Town Centre and the capacity constrained Pacific Highway.

In addition and as discussed in Section 2.3, Stantec obtained SCATs traffic count data from Transport for NSW at the Carlingford Road/ Rawson Street and Carlingford Road/ Beecroft Road intersection for 11 November 2022, Thursday, 18 May 2023 and Thursday, 13 June 2019. Across both intersections, a review of the 2022 and 2023 SCATS data indicated that traffic volumes had increased by two per cent in the AM peak and reduced by one per cent in the PM peak period. This review was completed in order to adjust the 2022 traffic volumes to match 2023 conditions during the specific peak hour periods for the purpose of existing conditions modelling.

A review of the 2019 and 2023 SCATS data indicates that during the identified peak hour periods (7:30 am to 8:30 am, and 4:15 pm to 5:15 pm respectively), traffic volumes had increased by 0.5 per cent per annum in the AM peak and had reduced by 0.25 per cent per annum in the PM peak. Notwithstanding, a review of 2019 and 2023 traffic volumes across the broader AM and PM peak periods is contained in Figure 8.6 and Figure 8.7.

Figure 8.6 – Traffic growth – 2019 to 2023 AM peak period

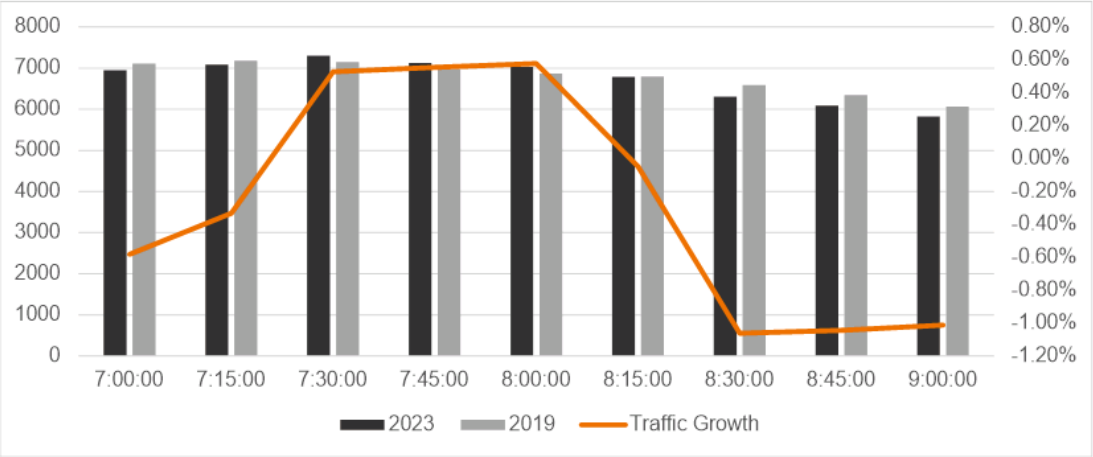
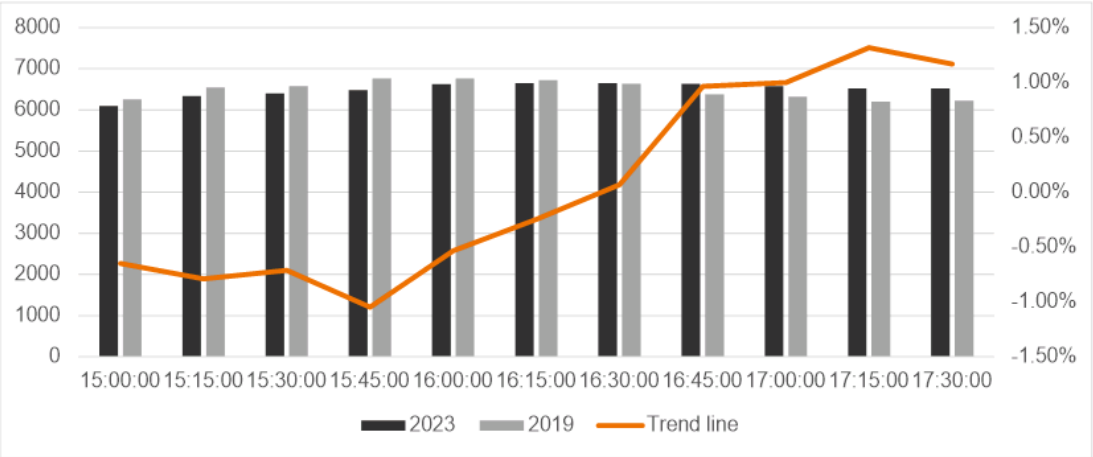


Figure 8.7 – Traffic growth – 2019 to 2023 PM peak period



As shown, the AM peak has a consistent peak period between 7:00am to 9:00am with minimal variation in total vehicles on the road network. Total traffic volumes for this period have ultimately reduced by 0.24 per cent per annum between 2019 and 2023. As such, there is ultimately no distinct pattern of traffic growth between 2019 and 2023, consistent with outcomes from the Transport for NSW traffic volume viewer.

The PM peak had a more distinct peak period in 2019 for hour periods starting at 3:45pm, 4:00pm and 4:15pm, with greater total traffic than recorded in 2023, with traffic volumes dropping off after this period, whereas the 2023 period had a smoother peak period with less variance in traffic volumes across the period. This indicates that traffic demand has smoothed out and spread across the peak period, noting total traffic volumes for this period have ultimately increased by 0.04 per cent per annum. As such, there is also no actual discernible growth in traffic, consistent with outcomes from the Transport for NSW traffic volume viewer.

Epping Road/ Langston Place/ Blaxland Road / Beecroft Road intersection upgrade

In April 2023, Transport for NSW awarded Mott MacDonald Australia the contract to develop the concept design, prepare the Review of Environmental Factors, manage early investigation work, and provide technical advice for the proposed upgrade.

Notwithstanding, while the proposed upgrades have been discussed for 20 to 30 years, they have never eventuated. It is understood that the potential adverse effect to patronage on M2 is a key issue from owners and operators of the motorway, with this issue continuing to be unresolved and hence impacting the practicality of this project proceeding.

Further, even with the upgrades, there remains further pinch points on the road network that will limit uplift in regional traffic growth. As it relates to Epping Town Centre, the pinch point will merely shift from the Epping Road/ Langston Place/ Blaxland Road / Beecroft Road intersection to the Beecroft Road/ Carlingford Road intersection.

Further assurance that this project will proceed, and indicative timelines, would be required to incorporate any impacts into traffic modelling for the proposed development.

Summary

With regards to the above, any additional traffic from developments along Rawson Street will simply continue to displace regional through traffic as it has done in the past. A conservative approach would be to consider additional traffic generation additive to the current situation.

Based on this, no regional background traffic growth rate has been adopted for this assessment as this would be contrary to the historical trend. Notwithstanding, traffic growth resulting from an uplift in development within Epping Town Centre has been considered as discussed below.

8.4.2 Traffic Growth in Epping Town Centre

242-244 Beecroft Road, Epping (SSD-8784, SSD-8784-Mod-1, SSD-31576972)

A concept development application under SSD 8784 was approval for a mixed use development comprising:

- maximum of 37,700 square metres residential gross floor area, which could provide up to 432 residential units
- maximum of 1,000 square metres non-residential gross floor area
- basement car parking.

At time of preparation of the Transport Impact Assessment, a detailed development application under SSD-31576972 was under assessment for a mixed use development comprising:

- 374 residential units
- 927 square metres commercial floor area
- basement car parking, motorcycle parking, bicycle parking and service vehicle spaces[15].

Vehicle access is proposed via both Ray Road and Beecroft Road (left in, left out only) in both the approved concept and proposed development.

The development application (SSD-8784-Mod-1, SSD-31576972) has since been approved on 19 September 2023.

Given SSD-31576972 was under assessment during preparation of the Transport Impact Assessment, the approved concept development has been considered in this assessment although noting this is a conservative approach as the traffic generation has naturally only reduced between applications given the reduction in residential units and commercial floor area. For the purpose of this assessment, traffic generation has been estimated based on rates agreed with stakeholders as detailed above. This equates to 91 to 73 vehicle trips in each peak hour, respectively.

245-250 Beecroft Road, Epping (DA/653/2022, PPSCC-387)

A proposed mixed use development under DA/653/2022 and PPSCC-387 at 245-250 Beecroft Road, Epping is currently under assessment. The proposal includes 103 residential apartments over three levels comprising 246 and 3,056 square metres retail and medical floor area, respectively.

The site is currently occupied by a service station. Given the current use, the development is expected to result in the reduction of 73 and 52 vehicle movements in the AM and PM peak periods, respectively[16]. As the development is under assessment, the expected reduction to trips have not been removed from the road network for the purpose of this assessment.

37-41 Oxford Street, Epping (DA/314/2017, DA/314/2017/A, DA/1/2022)

A concept development application under DA/314/2017 was approved for a mixed use development comprising:

- 257 residential units
- 438 square metres commercial floor area
- 591 square metres retail floor area.
- Basement car parking.

At time of preparation of the Transport Impact Assessment, a modified concept application under MOD314/2017/A and detailed application under DA/1/2022 were under assessment, noting both applications were initially refused in August and September 2022 however were under appeal. The proposed development under both applications comprises:

[15] Submissions Report, SSD 3156972 – 242 -244 Beecroft Road, Epping, Think Planners, May 2023
[16] Statement of Environmental Effects, 246-250 Beecroft Road, Epping, Urbis, 14 July 2022

- 204 residential units
- Childcare centre with 60 children
- 785 square metres commercial floor area
- 101 square metres retail floor area
- Basement car parking.

Each application proposes vehicle access from Oxford Street.

The development application (MOD314/2017/A and DA/1/2022) have since been approved (NSWLEC 1509) with decision date on 6 September 2023.

Given MOD314/2017/A and DA/1/2022 were under assessment during preparation of the Transport Impact Assessment, consistent with the approach for 242-244 Beecroft Road, the approved concept development has been considered in this assessment. For the purpose of this assessment, traffic generation has been estimated based on rates agreed with stakeholders as detailed above. This equates to 58 and 54 vehicle trips in each peak hour, respectively.

59 Beecroft Road, Epping (DA/944/2021, PPSSCC-292, [2022] NSWLEC 1705)

A development application under DA/944//2021 was refused, for a mixed use development comprising:

- 117 residential units
- 1,847 square metres commercial floor area
- 3,262 square metres retail floor area.
- Basement car parking.

Vehicle access was proposed via Rawson Street, north of the Council car park.

Notwithstanding the refusal, the site is clearly intended to be developed and as such, the refused scheme has been incorporated as potential traffic growth within Epping Town Centre. For the purpose of this assessment, traffic generation has been estimated based on rates agreed with stakeholders as detailed in Section 8.2. This equates to 66 and 116 vehicles trips in each peak hour, respectively.

48 - 54 Rawson Street, Epping (DA/61/2018/A, PPSSCC-365)

A Section 4.55 application under DA/61/2018/A was approved for a mixed use development comprising:

- 123 residential units
- 1,370 square metres retail floor area.
- Basement car parking.

Vehicle access is proposed via a minor laneway connecting to Rawson Street north of Hunts Lane.

For the purpose of this assessment, traffic generation has been estimated based on rates agreed with stakeholders as detailed in Section 8.2. This equates to 34 and 53 vehicles trips in each peak hour, respectively.

Summary

Table 8.9 has been prepared to summarise the anticipated traffic generation for each proposed, approved or potential development within Epping Town Centre.

Table 8.9: Traffic generation –Epping Town Centre development uplift

Site	Land Use	Land Use Scale	Traffic Rate		Trip Containment	Traffic Generation (vehs)	
			AM Peak	PM Peak		AM Peak	PM Peak
242-244 Beecroft Road, Epping	Residential	432 units	0.19 per unit	0.15 per unit	0%	82	65
	Commercial	1,000 sqm GFA	1.03 per 100m2 GFA	0.84 per 100m2 GFA	10%	9	8
	SubTotal					**91**	**73**
37-41 Oxford Street, Epping	Residential	257 units	0.19 per unit	0.15 per unit	0%	49	39
	Commercial	591 sqm GFA	1.03 per 100m2 GFA	0.84 per 100m2 GFA	10%	5	4
	Retail	438 sqm GFA (350 sqm GLFA [1])	4.5 per 100m2 GLFA	13.5 per 100m2 GLFA	20%	4	11
	SubTotal					**58**	**54**
59 Beecroft Road, Epping	Residential	117 units	0.19 per unit	0.15 per unit	0%	22	18
	Commercial	1,847 sqm GFA	1.03 per 100m2 GFA	0.84 per 100m2 GFA	10%	17	14
	Retail	3,262 sqm GFA (2,610 sqm GLFA [1])	4.5 per 100m2 GLFA	13.5 per 100m2 GLFA	20%	27	84
	SubTotal					**66**	**116**
48 - 54 Rawson Street,Epping	Residential	123 units	0.19 per unit	0.15 per unit	0%	23	18
	Retail	1,370 sqm GFA (1,096 sqm GLFA [1])	4.5 per 100m2 GLFA	13.5 per 100m2 GLFA	20%	11	35
	SubTotal					**34**	**53**
Total						**249**	**296**
245-250 Beecroft Road	*Development expected to reduce traffic compared to existing site, hence excluded from assessment*						

[1] Specialty retail GLFA assumed to equate to 80 per cent GFA, in accordance with Small Suburban Shopping Centres Analysis report ("Analysis Report") prepared by Bitzios on behalf of Transport for NSW dated 7 November 2018

Table 8.9 indicates the approved, proposed and potential background developments throughout Epping Town Centre could result in 249 and 296 vehicle trips in the AM and PM peak hours, respectively. When considering that 25 per cent of retail traffic is passing trade and hence while they are included in the total generation, they are not "new" trips on the road network, the background developments could actually result in an uplift of 240 and 263 new vehicle trips respectively in the AM and PM peak hours.

The directional distribution and assignment of traffic generated has been adopted based on assumptions outlined in Section 8.3.

Based on the above, the estimated increase in turning movements near the site following development of approved, proposed and potential background developments throughout Epping Town Centre in the AM and PM peak hours are summarised at Appendix D.

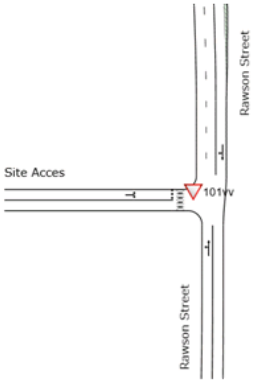
8.5 Rawson Street Arrangement

8.5.1 Site Vehicle Access

As discussed in Section 4.2, a single consolidated driveway will be provided along the southern boundary of the site to form the primary vehicular access into the basement car park and loading dock.

For the purpose of this assessment, the indicative site access layout is provided at Figure 8.8.

Figure 8.8 – Potential site access layout – priority controlled



Pedestrian volumes across the western leg of the intersection of 650 and 770 have been adopted for the assessment respectively in the AM and PM peak hours. This includes consideration for existing pedestrian volumes, the transfer of some vehicles from parking within the adjacent Council car park to parking on site to visit the supermarket asset, and an additional 245 and 250 pedestrians generated by the proposed development based on outcomes from the trip generation assessment outlined in Section 5.

8.5.2 Proposed Mitigation – Pedestrian Operated Signals

The existing pedestrian crossing along Rawson Street results in notable peak period queueing, particularly in the PM peak period, and operates close to practical capacity as detailed in Section 2.4.3. This pedestrian crossing presents a key challenge in accommodating an uplift in traffic along Rawson Street and hence the development proposes to deliver pedestrian operated signals at this location. This would provide a significant improvement to the operation of Rawson Street, improving access to both existing and potential developments within the Town Centre.

The design of the signals could be developed as part of future development applications, however would naturally require suitable kerb build outs to provide adequate pedestrian queueing area. For the purpose of this assessment, the signals have been coded as practical cycle time, with a maximum cycle time of 60 seconds.

It is noted that site observations indicate that less vehicles turn right out of the Council car park (and hence the future site access) during peak periods to avoid localised congestion at this midblock crossing, increasing reliance on the Rawson Street/ Carlingford Road intersection and reducing incentives for vehicles to take advantage of the local collector road networks as avenues to feed back onto the arterial road network. To ensure a conservative assessment, the potential redistribution of traffic away from the Rawson Street/ Carlingford Road intersection has not been considered.

8.6 Traffic Impact

8.6.1 Overview

A detailed summary of anticipated future operation of key intersections in the network in the AM and PM peak periods for each modelling scenario, without and with mitigation measures, are presented respectively in Section 8.6.2 and 8.6.3, with a summary of all modelling results presented in Section 0.

8.6.2 Detailed Modelling Results

Table 8.10 presents a summary of the operation of the key intersections post development, with full results presented in Appendix E.

Table 8.10: Scenario 2 operation – post development operating conditions

Intersection	Peak Period	Degree of Saturation (DOS)	Average Delay (sec)	Average Queue (m)	Level of Service (LOS)
Carlingford Rd/ Beecroft Rd	AM	0.98	52	207	LOS D
	PM	1.00	54	277	LOS D
Carlingford Rd/ Ray Rd/ Rawson St	AM	1.55	53	157	LOS D
	PM	0.83	33	114	LOS C
Carlingford Rd/ Midson Rd	AM	0.92	56	143	LOS D
	PM	0.97	57	171	LOS E
Epping Rd/ Blaxland Rd/ Beecroft Rd	AM	0.96	29	170	LOS C
	PM	0.99	50	289	LOS D
Rawson Street/ Bridge St	AM	0.74	22	24	LOS B
	PM	0.74	19	27	LOS D=B
Rawson Street Site Access	AM	0.24	14	4	LOS A
	PM	0.51	17	10	LOS B
Rawson Street pedestrian crossing (signalised)	AM	0.61	10	34	LOS A
	PM	0.52	10	27	LOS A

Table 8.10 indicates that most intersections are expected to operate similar to the existing condition, with overall average delays increasing by up to four seconds at any intersection, with exception of the Rawson Street/ Carlingford Road/ Ray Road intersection during each peak and Epping Road/ Blaxalnd Road/ Beecroft Road/ Langston Place intersection in the PM peak period. Given the right turn from Rawson Street is already operating close to capacity in each peak period, and noting the limited storage available on the western edge of Carlingford Road / Beecroft Road intersection to accommodate additional vehicles, any uplift in demands places pressure on the performance of the intersection. This is seen with the degree of saturation increasing from 0.95 to 1.55 in the AM peak period, and with the overall intersection delays expected to increase by around 16 and seven seconds in the AM and PM peak periods, respectively. Similarly, the Epping Road/ Blaxalnd Road/ Beecroft Road/ Langston Place intersection operates close to capacity particularly during the PM peak period, as shown with degree of saturation of 0.99, and hence any incremental increase in traffic results in additional delays, with overall intersection delays increasing by seven seconds.

Table 8.12 presents a summary of the operation of the key intersections following further development uplift within Epping Town Centre, without the development, with full results presented in Appendix E. As already discussed, the Rawson Street pedestrian crossing operates close or at capacity during both peak hours. With this in mind, and as shown in Table 8.12, any uplift of development along Rawson Street results in the crossing operating over capacity. When this occurs in a network model, vehicles that cannot pass through the crossing are considered as "unreleased demand" in the network and can result in upstream intersections appearing to operate better due to the reduced demand on an approach. As such, the pedestrian crossing has been removed from the network model to ensure this effect does not impact the actual performance of key intersections, including Carlingford Road/ Rawson Street/ Ray Road.

Table 8.11: Scenario 3 operation – development uplift in Epping Town Centre generally, without development conditions

Intersection	Peak Period	Degree of Saturation (DOS)	Average Delay (sec)	Average Queue (m)	Level of Service (LOS)
Carlingford Rd/ Beecroft Rd	AM	1.00	50	216	LOS D
	PM	1.01	60	321	LOS E
Carlingford Rd/ Ray Rd/ Rawson St	AM	1.25	47	181	LOS D
	PM	0.82	31	114	LOS C
Carlingford Rd/ Midson Rd	AM	0.91	57	147	LOS E
	PM	0.96	55	158	LOS D
Epping Rd/ Blaxland Rd/ Beecroft Rd	AM	0.98	31	176	LOS C
	PM	1.03	69	388	LOS E
Rawson Street/ Bridge St	AM	0.69	18	20	LOS B
	PM	0.39	8	6	LOS A
Rawson Street pedestrian crossing (unsignalised)	AM	1.05	66	70	LOS E
	PM	1.20	195	191	LOS F

Table 8.11 indicates that following uplift of development within Epping Town Centre, and without the development, the Carlingford Road/ Beecroft Road intersection during both peak periods and Epping Road/ Blaxland Road/ Beecroft Road intersection doing the PM peak hour will operate near or at capacity with LOS D or E and with a degree of saturation of just over 1.00. This is a result of the intersections already operating with high degree of saturations of 0.96 to 0.98.

Similar to scenario 2, the Rawson Street/ Carlingford Road intersection operates well in the PM peak hour and at capacity in the PM peak hour, however the right turn operates with a degree of saturation at 1.25.

Table 8.12 presents a summary of the operation of the key intersections post development and following further development uplift within Epping Town Centre, with full results presented in Appendix E.

Table 8.12: Scenario 4 operation – development uplift in Epping Town Centre generally and post development conditions

Intersection	Peak Period	Degree of Saturation (DOS)	Average Delay (sec)	Average Queue (m)	Level of Service (LOS)
Carlingford Rd/ Beecroft Rd	AM	1.01	55	227	LOS D
	PM	1.02	59	299	LOS E
Carlingford Rd/ Ray Rd/ Rawson St	AM	1.90	74	181	LOS F
	PM	0.89	40	140	LOS C
Carlingford Rd/ Midson Rd	AM	0.92	59	147	LOS E
	PM	1.00	62	186	LOS E
Epping Rd/ Blaxland Rd/ Beecroft Rd	AM	0.97	31	186	LOS C
	PM	1.02	67	385	LOS E
Rawson Street/ Bridge St	AM	0.80	27	29	LOS B
	PM	0.85	28	41	LOS B
Rawson Street Site Access	AM	0.40	16	4	LOS B
	PM	0.58	20	11	LOS B
Rawson Street pedestrian crossing (signalised)	AM	0.64	10	37	LOS A
	PM	0.57	9	31	LOS A

Table 8.12 indicates that with both the proposed development and uplift of background traffic within Epping Town Centre, the intersections are expected to operate in a similar condition to scenario 3.

8.6.3 Mitigation Measures

Three additional scenarios have been explored with various mitigation measures employed, exploring potential impacts of these measures on scenario 4 which has previously been documented. These scenarios are:

- 40 right turning vehicles redistributed to turn right at the Carlingford Road/ Midson Road intersection during the AM peak hour.
- Removing the pedestrian crossing on the eastern approach to the Carlingford Road/ Rawson Street/ Ray Road intersection.
- Triple Right Turn from Carlingford Road to Beecroft Road at the Carlingford Road/ Beecroft Road intersection.

Traffic Re-distribution

In Section 2.3.2, it is noted *"around 70 per cent of traffic turning right from Rawson Street onto Carlingford Road in the AM peak hour currently originate from areas outside of the town centre. As such, in reality the increased traffic generated from within the town centre will likely reduce the appeal of this route as an existing rat run and existing vehicles will likely re-route to access Carlingford Road via other available intersections, including Midson Road. Such an event is clearly evident in congested town centres such as Chatswood that have continued to develop without any significant increase in road network capacity, with the co-location of the railway / metro / bus interchange ensuring any new residents / workers and visitors have viable access to alternative modes of transport and therefore ensuring continued equitable access to travel without necessitating the need for road network upgrades throughout development."*

The assessment was prepared to ensure conservative results and has not allowed for any redistribution of existing background traffic. Notwithstanding, given Council's commentary and approval for this methodology and following commentary contained in the Transport Assessment, a scenario contemplating the redistribution of traffic from turning right at Rawson Street to turning right at an alternate location (Kent Street or Midson Road) has been completed. Currently, around 62 vehicles turn right from Rawson Street in the AM peak period, with up to 44 of those originating from out of the town centre.

With that in mind, the redistribution of right turning traffic has been explored in the mitigation modelling scenarios summarised in this section.

Removal of Pedestrian Crossing at Carlingford Road/ Rawson Street/ Ray Road Intersection

Following recommendations from Council in a letter dated 22 December 2023 (reference RZ/3/2023), a scenario considering the removal of the pedestrian crossing on the eastern approach to the Carlingford Road/ Rawson Street/ Ray Road intersection has been explored. Given the availability of two pedestrian crossing opportunities along Carlingford Road within 50 metres of this location, this is considered a suitable option.

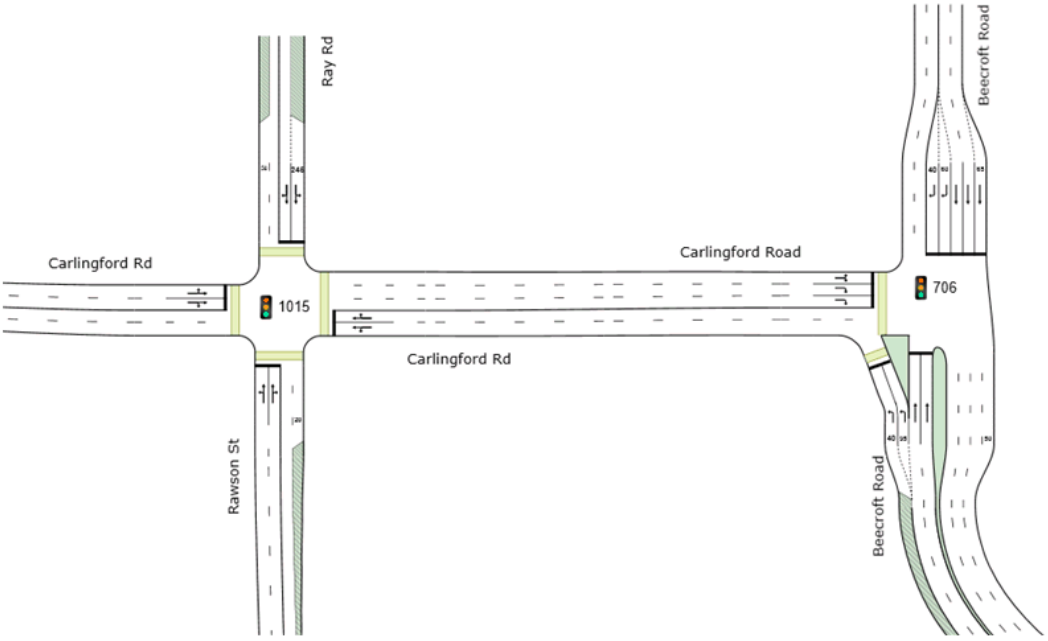
Triple Right Turn from Carlingford Road to Beecroft Road

Following Council direction set out in a letter dated 22 December 2023 (reference RZ/3/2023), a scenario involving lengthening the existing left turn slip lane from Carlingford Road onto Beecroft Road to provide a full length lane between Rawson Street and Beecroft Road, and conversion of the lane to allow both right and left turn movements from Carlingford Road onto Beecroft Road has been explored.

Due to the geometry of the Carlingford Road/ Beecroft Road intersection, it is expected that the inside radius of the centre lane cannot be altered (i.e. reduced) without impacting the ability for larger vehicles to turn right from this lane. As such, the kerb line along Beecroft Road its eastern edge/ south departure would need to be extended further east to accommodate a lane for vehicles to turn right from the new eastbound lane along Carlingford Road. Based on current land boundaries, it appears a minor allowance for a short departure lane on the southern approach has been catered for, such that on departure there are three full length lanes as per existing and one new short departure lane. For the purpose of this modelling, the additional short lane is expected to be 50 metres in length. Based on this arrangement, the new short lane would have no impact on the performance of Beecroft Road north approach and would only impact the performance of Carlingford Road.

An indicative layout is shown in Figure 8.9.

Figure 8.9 – Carlingford Road/ Beecroft Road indicative intersection geometry



Results have exclusively been provided for the operation of select key intersections, including Rawson Street/ Carlingford Road / Ray Road, Carlingford Road/ Beecroft Road and Carlingford Road/ Midson Road, given the mitigations generally do not impact performance at the other surrounding intersections.

Modelling results for the various scenarios above documented as follows:

- Traffic re-distribution only is shown in Table 8.13 (mitigation A).
- Traffic re-distribution and removal of pedestrian crossing is shown in Table 8.14 (mitigation B).
- Traffic re-distribution and triple right turn at Carlingford Road/ Beecroft Road is shown in Table 8.15 (mitigation C).
- Traffic re-distribution, removal of pedestrian crossing and triple right turn at Carlingford Road/ Beecroft Road is shown in Table 8.16 (mitigation D).

Detailed SIDRA results are included in Appendix E.

Table 8.13: Scenario 4 operation – redistribution of background traffic (Mitigation A)

Intersection	Peak Hour	Peak Period	Degree of Saturation (DOS)	Average Delay (sec)	Average Queue (m)	Level of Service (LOS)
Carlingford Rd/ Ray Rd/ Rawson St	AM	South	1.38	127	70	LOS F
		East	0.50	22	50	LOS B
		North	0.91	61	89	LOS E
		West	0.92	53	199	LOS D
		Overall	**1.38**	**53**	**199**	**LOS D**
Carlingford Rd/ Beecroft Rd	AM	South	1.00	48	227	LOS D
		North	1.00	38	86	LOS C
		West	1.00	72	50	LOS F
		Overall	**1.01**	**52**	**227**	**LOS D**
Carlingford Rd/ Midson Rd	AM	South	0.89	59	105	LOS E
		East	0.92	60	146	LOS E
		North	0.92	67	81	LOS E

Intersection	Peak Hour	Peak Period	Degree of Saturation (DOS)	Average Delay (sec)	Average Queue (m)	Level of Service (LOS)
		West	0.91	58	147	LOS E
		Overall	**0.92**	**60**	**147**	**LOS E**

As shown in Table 8.13, redistribution of background traffic results in a significant uplift in the performance of the Carlingford Rd/ Ray Rd/ Rawson St intersection, improving from Level of Service F to D, with minimal impact to the operation of the Carlingford Rd/ Midson Rd intersection. It is noted that should Council proceed with updating the Carlingford Road/ Kent Street intersection, the traffic would likely redistribute to spread across both the Midson Road and Kent Street intersection, further minimising any associated impacts.

As such, the following results focus on mitigation measures assuming the redistribution of background traffic in the AM peak hour.

Table 8.14: Scenario 4 operation – redistribution of background traffic and removal of pedestrian crossing (Mitigation B)

Intersection	Peak Hour	Peak Period	Degree of Saturation (DOS)	Average Delay (sec)	Average Queue (m)	Level of Service (LOS)
Carlingford Rd/ Ray Rd/ Rawson St	AM	South	0.98	53	53	LOS D
		East	0.56	28	55	LOS B
		North	0.72	39	71	LOS C
		West	1.01	106	274	LOS F
		Overall	**1.01**	**63**	**274**	**LOS E**
Carlingford Rd/ Beecroft Rd	AM	South	1.03	55	239	LOS D
		North	1.00	39	86	LOS C
		West	1.00	62	55	LOS E
		Overall	**1.03**	**52**	**239**	**LOS D**

Table 8.14 indicates that in both peak hours, the removal of the pedestrian crossing has limited benefit to the operation of the key intersections as an isolated mitigation measure.

During the AM peak hour, to better balance delays at the intersection, SIDRA redistributes phase time away from Carlingford Road and to Rawson Street/ Ray Road and while this significantly improves the operation of Rawson Street, with degree of saturations returning to near 1.00, the operation of Carlingford west approach degrades. Further, the degree of saturation and average delay at the Carlingford Road/ Beecroft Road intersection slightly increases. This is primarily a result of the model no longer having "unreleased demand" at the Carlingford Road/ Rawson Street/ Ray Road intersection, as indicated by the Degree of Saturations settling around 1.00.

Table 8.15: Scenario 4 operation – redistribution of background traffic and three lanes along Carlingford Road (Mitigation C)

Intersection	Peak Hour	Peak Period	Degree of Saturation (DOS)	Average Delay (sec)	Average Queue (m)	Level of Service (LOS)
Carlingford Rd/ Ray Rd/ Rawson St	AM	South	1.00	63	48	LOS E
		East	0.54	26	50	LOS B
		North	0.80	52	72	LOS D
		West	0.98	86	250	LOS F
		Overall	**1.00**	**58**	**250**	**LOS E**
Carlingford Rd/ Beecroft Rd	AM	South	0.98	45	216	LOS D
		North	0.89	31	83	LOS C
		West	0.93	48	50	LOS D
		Overall	**0.98**	**42**	**216**	**LOS C**

Table 8.15 indicates that during both peak periods, the provision of three lanes along Carlingford Road results greater improvement to the operation of key intersections than the removal of pedestrian crossing on the eastern edge of the intersection.

Table 8.16: Scenario 4 operation – redistribution of background traffic, removal of pedestrian crossing and three lanes along Carlingford Road (Mitigation D)

Intersection	Peak Hour	Peak Period	Degree of Saturation (DOS)	Average Delay (sec)	Average Queue (m)	Level of Service (LOS)
Carlingford Rd/ Ray Rd/ Rawson St	AM	South	0.97	57	48	LOS E
		East	0.55	27	55	LOS B
		North	0.68	44	60	LOS D
		West	0.99	91	257	LOS F
		Overall	**0.99**	**58**	**257**	**LOS E**
Carlingford Rd/ Beecroft Rd	AM	South	0.98	45	216	LOS D
		North	0.89	31	83	LOS C
		West	0.93	43	55	LOS D
		Overall	**0.87**	**40**	**216**	**LOS C**

Table 8.16 indicates that the combination of both mitigations, being the provision of three lanes along Carlingford Road between Rawson Street and Beecroft Road and removal of the pedestrian crossing on the eastern approach to the Carlingford Road/ Rawson Street/ Ray Road intersection, results in the best overall performance of key intersections.

It is expected this is due to the following:

- The removal of the pedestrian crossing results in greater "effective green time" for left turning vehicles from Ray Road and right turning vehicles from Rawson Street. However, Ray Road still has priority over Rawson Street and therefore given the uplift in vehicles expected on this movement, they are occupying the storage capacity along Carlingford Road
- The provision of three lanes therefore provides greater opportunity for vehicles from Rawson Street to turn onto Carlingford Road, as vehicles from Ray Road would preference turning into the two kerb side lanes, and vehicles from Rawson Street would preference turning into the two centre lanes.

As already noted, SIDRA has attempted to balance delays at the Carlingford Rd/ Ray Rd/ Rawson St intersection through redistributing phase time away from Carlingford Road and towards Rawson Street/ Ray Road. A scenario locking the phase times against the original Scenario 4 phase times indicates that the key intersections with mitigations will operate better than the without mitigation scenarios, with Rawson Street/ Ray Road/ Carlingford Road operating with a Degree of Saturation 1.23, average delay of 45 seconds and Level of Service D.

8.6.4 Traffic Impact Summary

Table 8.17 provides a summary of the overall Level of Service (LOS) estimated at each modelled intersection on the network. Table 8.17 provides a summary of the overall Level of Service (LOS) estimated at each modelled intersection on the network, based on the four mitigation measures applied to scenario 4 respectively as detailed previously.

Table 8.17: Summary of network results – AM and PM peak period level of service estimates

Intersection	Peak	Level of Service			
		Existing	Scenario 2	Scenario 3	Scenario 4
Carlingford Rd/ Beecroft Rd	AM	D	D	D	D
	PM	D	D	E	E
Carlingford Rd/ Ray Rd/ Rawson St	AM	C	D	D	F
	PM	B	C	C	C
Carlingford Rd/ Midson Rd	AM	D	D	E	E
	PM	D	E	D	E
Epping Rd/ Blaxland Rd/ Beecroft Rd	AM	C	C	C	C
	PM	D	D	E	E
Rawson Street/ Bridge St	AM	B	B	B	B
	PM	B	B	A	B
Rawson Street pedestrian crossing (signalised)	AM	C [1]	A [2]	E [1]	A [2]
	PM	C [1]	A [2]	F [1]	A [2]
Rawson Street Site Access	AM	N/a	A	N/a	B
	PM	N/a	B	N/a	B

[1] Unsignalised pedestrian crossing, as per existing condition
[2] Signalised pedestrian crossing

Table 8.18: Summary of network results – AM and PM peak period level of service estimates (continued)

Intersection	Peak	Level of Service			
		Scenario 4 Mitigation A	Scenario 4 Mitigation B	Scenario 4 Mitigation C	Scenario 4 Mitigation D
Carlingford Rd/ Beecroft Rd	AM	D	D	C	C
Carlingford Rd/ Ray Rd/ Rawson St	AM	D	E	E	E
Carlingford Rd/ Midson Rd	AM	E	E	E	E
Epping Rd/ Blaxland Rd/ Beecroft Rd	AM	C	E	C	C
Rawson Street/ Bridge St	AM	B	B	B	B
Rawson Street pedestrian crossing (signalised)	AM	A	A	A	A
Rawson Street Site Access	AM	N/a	N/a	N/a	N/a

Figure 8.10 through to Figure 8.17 illustrate the level of service estimates for the various intersections. The intersections are labelled as per the following:

1. Carlingford Rd/ Beecroft Rd
2. Carlingford Rd/ Ray Rd/ Rawson St
3. Carlingford Rd/ Midson Rd
4. Epping Rd/ Blaxland Rd/ Beecroft Rd
5. Rawson Street/ Bridge St
6. Rawson Street pedestrian crossing (signalised)
7. Rawson Street Site Access.

Figure 8.10 – Existing level of service estimates

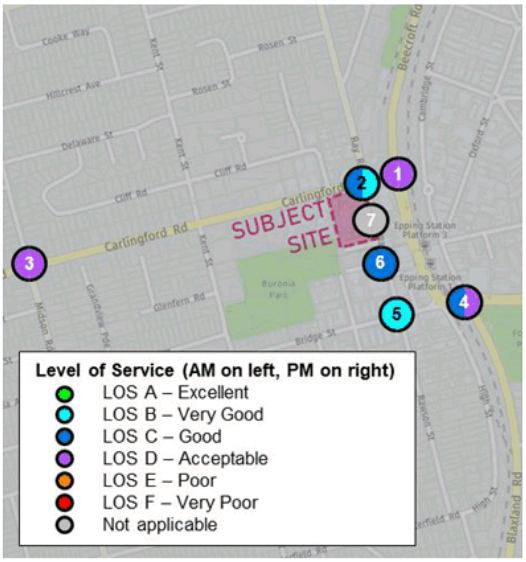


Figure 8.11 – Scenario 2 level of service estimates

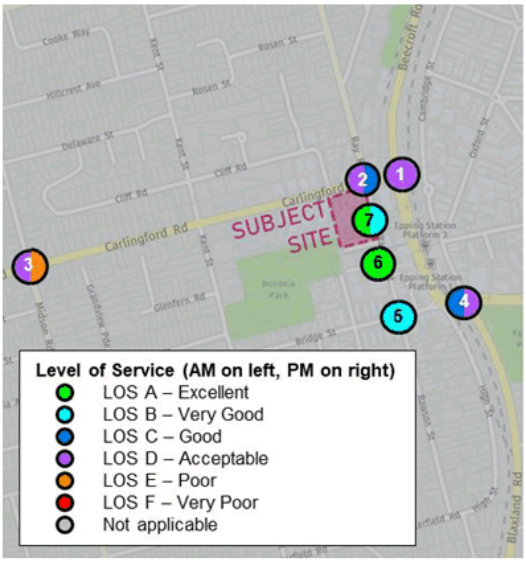


Figure 8.12 – Scenario 3 level of service estimates

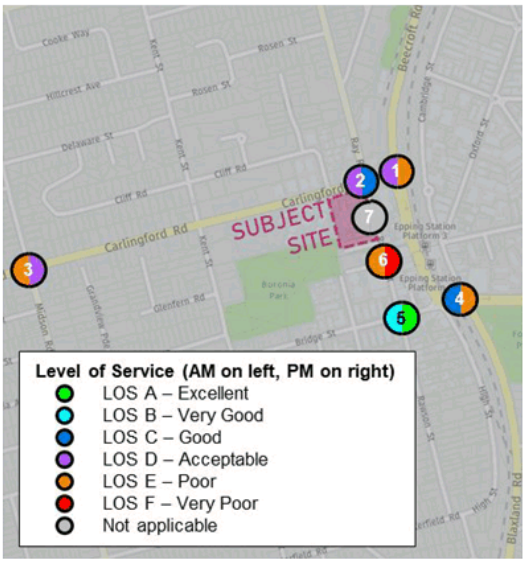


Figure 8.13 – Scenario 4 level of service estimates

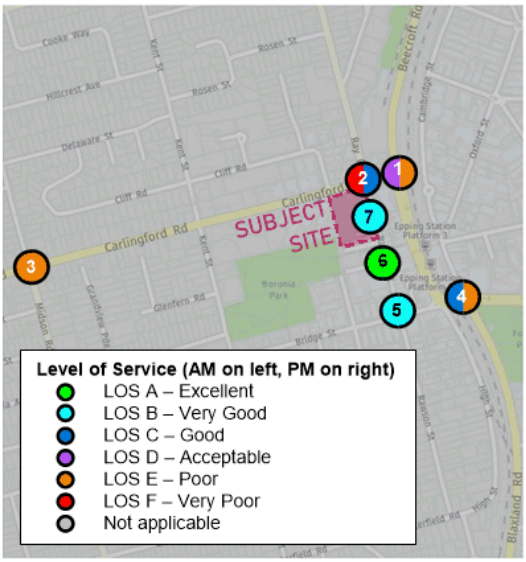


Figure 8.14 – Scenario 4 Mitigation A level of service estimates

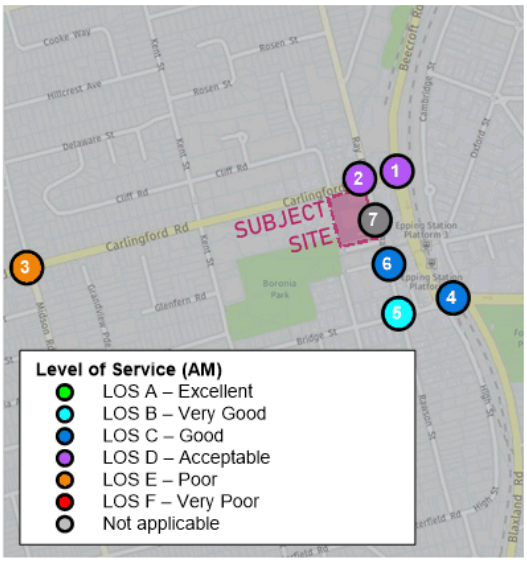


Figure 8.15 – Scenario 4 Mitigation B level of service estimates

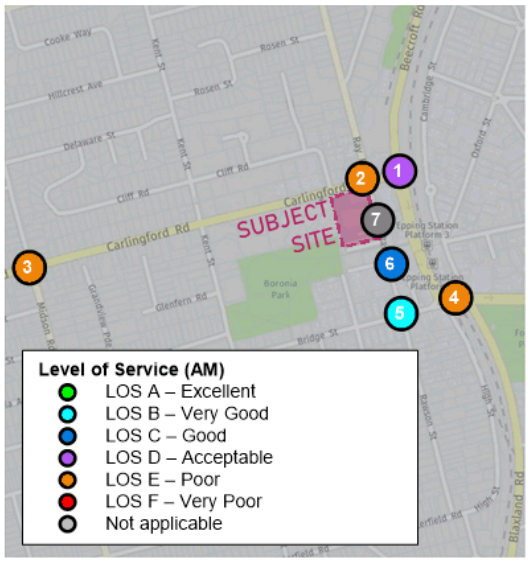


Figure 8.16 – Scenario 4 Mitigation C level of service estimates

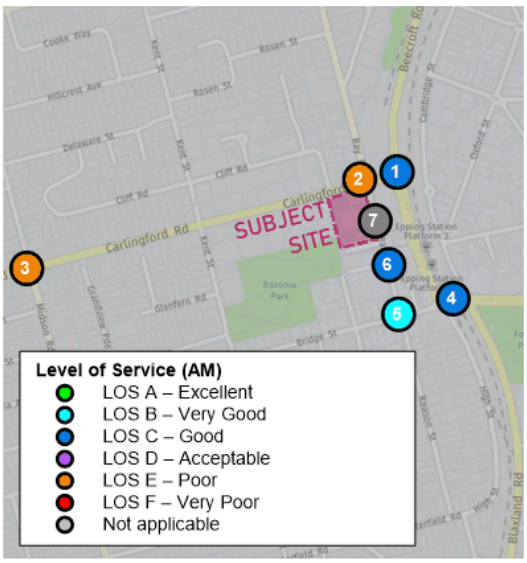
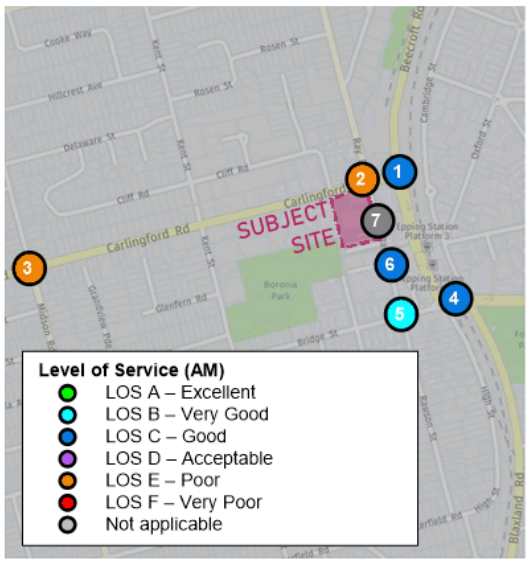


Figure 8.17 – Scenario 4 Mitigation D level of service estimates



Traffic analysis presented in this report and as summarised above indicates it is clear the development has a relatively minor impact on the operation of surrounding intersections, with or without background traffic growth from developments within the town centre, with exception of the Carlingford Road/ Rawson Street/ Ray Road intersection during the AM peak hour specifically due to the limited capacity of the right turn from Rawson Street to Carlingford Road to accommodate an uplift in traffic. Notwithstanding, the provision of a third eastbound lane along Carlingford Road between Rawson Street and Beecroft Road would result in increased capacity for vehicles exiting Rawson Street and allow for similar performance of the intersection under scenario two, however may not deliver enough capacity to accommodate all potential development within the town centre under scenario four.

As discussed in Section 2.3.2, around 70 per cent of traffic turning right from Rawson Street onto Carlingford Road in the AM peak hour currently originate from areas outside of the town centre. As such, in reality the increased traffic generated from within the town centre will likely reduce the appeal of this route as an existing rat run and existing vehicles will likely re-route to access Carlingford Road via other available intersections, including Midson Road. Such an event is clearly evident in congested town centres such as Chatswood that have continued to develop without any significant increase in

road network capacity, with the co-location of the railway / metro / bus interchange ensuring any new residents / workers and visitors have viable access to alternative modes of transport and therefore ensuring continued equitable access to travel without necessitating the need for road network upgrades throughout development.

It is also noted that this assessment is conservative, allowing for greater uplift in development at sites within Epping Town Centre including 59 Beecroft road, noting the recent refusal of this development, 245 to 250 Beecroft Road which is expected to result in a reduction to traffic generated by this site, and 242 to 244 Beecroft road whose detailed development application results in less residential units (60 units) and commercial floor area (70 square metres) compared to the approved concept application.

Further, additional traffic expected to turn right from Rawson Street onto Carlingford Road would also likely reduce given the performance of this approach, with vehicles intending to travel north using routes such as Ray Road and Kandy Avenue, as well as less (if any) retail traffic traveling to and from the east given availability of other retail assets that may result in lower travel times for users and therefore hold more appeal.

In the context of the broader aspirations surrounding development within Epping Town Centre, as well as aspirations surrounding development that promotes sustainable travel given proximity to a rail and bus interchange and integrated land uses that co-locates jobs, housing and retail, thereby containing trips internally to Epping, the impacts of the Planning Proposal can, on this assessment be satisfactorily managed.

8.6.5 Site Access Operation

The operation of the site access, including all relevant approaches, is presented in Table 8.19 for scenario 2 and 4. Results are consistent in with and without mitigation at Carlingford Road with full results presented in Appendix E.

Table 8.19: Post development – site access operating conditions

Scenario	Peak Period	Approach	Degree of Saturation (DOS)	Average Delay (sec)	Average Queue (m)	Level of Service (LOS)
2 (With development and without background traffic growth)	AM	South	0.35	6	5	LOS A
		North	0.24	14	4	LOS A
		West	0.36	14	4	LOS A
	PM	South	0.39	8	7	LOS A
		North	0.29	16	6	LOS B
		West	0.51	17	8	LOS B
4 (With development and background traffic growth)	AM	South	0.32	8	3	LOS A
		North	0.31	15	4	LOS B
		West	0.40	16	4	LOS B
	PM	South	0.43	10	8	LOS A
		North	0.35	19	9	LOS B
		West	0.58	20	11	LOS B

Table 8.19 indicates the site access is expected to operate well and with significant spare capacity in all scenarios. Results are based on the worst performing movements on each approach, and hence represent the right turn from north, right turn from west and left turn from south. As shown, these turning movements are expected to operate with low average queues of up to 11 metres. As such, the intersection could not be expected to impact the operation of the adjacent Rawson Street/ Carlingford Road/ Ray Road intersection.

8.7 Proportional Increase in Traffic Volumes

Overall, the proposed modification traffic anticipated to travel through the key surrounding intersections is expected to be minor.

A summary of the proportional increase in traffic through the study intersections is detailed in Table 8.20.

Table 8.20: Summary of estimated traffic volumes

Intersection	AM Peak Hour			PM Peak Hour		
	Existing Traffic	Uplift in Development Traffic	% change from existing	Existing Traffic	Uplift in Development Traffic	% change from existing
Rawson St/ Carlingford Rd/ Ray Rd	2,641	83	**3%**	2,485	73	**3%**
Carlingford Rd/ Midson Rd	2,826	38	**1%**	2,901	20	**1%**
Carlingford Rd/ Beecroft Rd	4,655	46	**1%**	4,166	30	**1%**
Epping Rd/ Blaxland Rd/ Langston Pl	4,879	48	**1%**	4,512	41	**1%**

This indicates that the proposal would likely contribute to an uplift of one per cent traffic for all relevant signlaised intersections, with exception of the Rawson Street/ Carlingford Road/ Ray Road intersection where it would likely contribute to an uplift of three per cent traffic compared to existing traffic volumes.

9. Overview Green Travel Plan

9.1 Introduction

9.1.1 Travel Plan Framework

Transport is a necessary part of life which has effects that can be managed. The transport sector is one of the fastest growing emissions sectors in Australia and therefore a travel plan provides an opportunity for reducing greenhouse gases, and for managing traffic congestion (which has adverse economic, health and social outcomes). As well as delivering better environmental outcomes, providing a range of travel choices with a focus on walking, cycling and public transport will have major public health benefits and will ensure strong and prosperous communities.

The physical infrastructure being provided as part of any development is only part of the solution. A green travel plan (GTP) will ensure that the transport infrastructure, services, and policies both within and external to the site are tailored to the users and co-ordinated to achieve the most sustainable outcome possible.

9.1.2 What is a Green Travel Plan

A GTP is a package of actions and strategies aimed at encouraging sustainable modes of transport such as walking, cycling, public transport and higher-occupancy car use for travel. They aim to mitigate (as far as possible) private car commuting to allow people to carry out their daily business in a more sustainable manner using the following:

- measures which encourage reduced car use (disincentives or 'sticks')
- measures which encourage or support sustainable travel (such as active transport, public transport, and multi-occupant vehicle use)
- measures to reduce the need to travel or make travelling more efficient (incentives or 'carrots').

A GTP seeks to:

- advise residents, staff and visitors on the wider travel choices available to them and encourage use of sustainable travel modes
- aim to reduce congestion on the surrounding road network by causing mode shift from private vehicles, or at the very least encourage higher vehicle occupancy to reduce private vehicle trips.

9.1.3 Key Objectives

The aim of the GTP is to bring about better transport arrangements for living and working at the site. The key objectives of the plan are:

- to encourage walking
- to encourage cycling
- to encourage the use of public transport
- to reduce the use of the car, in particular single car occupancy
- where it is necessary to use the car, encourage more efficient use.

It is the intention therefore that the travel plan would deliver the following benefits:

- enable higher public and active travel mode share targets to be achieved
- contribute to greenhouse gas emission reductions and carbon footprint minimisation
- contribute to healthy living for all
- contribute to social equity and reduction in social exclusion
- improve knowledge and contribute to learning.

9.1.4 Site Specific Measures

Implementation of a GTP would benefit from the established pedestrian network surrounding the site, as well as the high frequency of bus and train services that run near it. A GTP would put in place measures to raise awareness and further influence the travel patterns of people living, working or visiting the site with a view to encouraging modal shift away from cars.

The following potential measures and initiatives could be implemented to encourage more sustainable travel modes:

- Limiting on-site parking provision.

- Open up shortcuts for pedestrian access through the site.
- Providing a car sharing pod(s) on-site and promoting the availability of car sharing pods for trips that require the use of private vehicles.
- Providing bicycle facilities including secure bicycle parking for staff, bicycle racks/ rails for visitors and shower and change room facilities.
- Ensure bicycle parking is clearly visible or provide signage to direct people to cycle bays.
- Provide a Travel Access Guide (TAG) which would be provided to all residents and staff and publicly available to all visitors. The document would be based on facilities available at the site and include detail on the surrounding public transport services and active transport initiatives. The TAG would be updated as the surrounding transport environment changes.
- Providing public transport information boards/ apps to inform residents, staff and visitors of alternative transport options (the format of such information boards would be based upon the TAG).
- Encouraging staff that drive to work and park on surrounding roads to carpool through creation of a carpooling club or registry/ forum.
- Regularly promoting ride/ walk to workdays.
- Providing a regular newsletter to all residents and staff members bringing the latest news on sustainable travel initiatives in the area.

9.1.5 Travel Access Guide

A TAG provides information to residents, staff and visitors on how to travel to the site using sustainable transport modes such as walking and public transport. The information is presented visually in the format of a map (or app) showing the site location and nearby transport modes highlighting available pedestrian and cycle routes. The information is usually presented as a brochure (or app) to be included in a welcome pack or on the back of company stationery and business cards.

9.1.6 Information and Communication

Several opportunities exist to provide residents, staff and visitors with information about nearby transport options. Connecting residents, staff and visitors with information would help to facilitate journey planning and increase their awareness of convenient and inexpensive transport options which support change in travel behaviour. These include:

- Transport NSW provides bus, train and ferry routes, timetables and journey planning through their Transport Info website: http://www.transportnsw.info.
- Council provides a number of services and a range of information and events to encourage people of all levels of experience to travel by bicycle.
- In addition, connecting residents, staff and visitors via social media may provide a platform to informally pilot new programs or create travel-buddy networks and communication.

9.1.7 Monitoring of the GTP

There is no standard methodology for monitoring the GTP, but it is suggested that it be monitored to ensure that it is achieving the desired benefits and modify it if required. It will not be possible at this stage to state what additional modifications might be made as this will be dependent on the particular circumstances prevailing at that time.

The GTP should be monitored on a regular basis, e.g., yearly, by carrying out travel surveys. Travel surveys will allow the most effective initiatives of the GTP to be identified, and conversely less effective initiatives can be modified or replaced to ensure the best outcomes are achieved. It will clearly be important to understand people's reasons for travelling the way they do: - any barriers to changing their behaviour, and their propensity to change.

To ensure the successful implementation of the GTP, a Travel Plan Coordinator (TPC) should be appointed to ensure the successful implementation of the GTP. This could be the building manager or a member of the body corporate.

10. Conclusion

The following conclusions are made based on the analysis and discussions presented within this report:

- It is proposed to amend the planning controls in the Parramatta Local Environment Plan (LEP) 2023 to permit mixed-use development on land currently zoned E1 (Local Centre) and increase the maximum floor space ratio and height controls that currently apply to the site.
- A key strategic merit of the development is the opportunity to promote sustainable travel given the high-density mixed-use nature of the development within a strategic centre; and within 200 metres of a rail interchange that provides convenient access to local and regional residential, commuter, retail and recreational centres.
- The development also has the potential to make a positive contribution to the surrounding area by providing a new retail precinct at the gateway to Epping Town Centre with a supermarket and speciality retail offerings, as well as an expanded and permeable public domain.
- The indicative development yield is around 420 apartments and around 13,677 square metres of non-residential uses.
- It is recommended that car parking for the future land uses be provided in accordance with the requirements of the Parramatta DCP 2011.
- It is recommended that bicycle parking for the future land uses be provided in accordance with the requirements of the Parramatta DCP 2011.
- The site loading strategy, including a basement loading dock with six loading bays, is expected to have capacity for the anticipated loading demands of the development.
- The design currently allows for a single consolidated driveway along the southern boundary of the site at Rawson Street aligned with the DCP 2011 service lane. It is recommended the service lane is extended to Carlingford Road and developed as the primary vehicular access for service vehicles only into the loading dock. During flood events, controls could be implemented including through use of boom gates to close the Carlingford Road access, with service vehicles directed to use the Rawson Street access instead.
- The proposed parking layout and loading areas will be progressed as part of future staged development applications to be consistent with the dimensional requirements as set out in DCP 2011 and Australian/New Zealand Standard for Off Street Car Parking (AS/NZS2890.1:2020, AS/NZS2890.2:2018 and AS/NZS2890.6:2022).
- The proposed development could be expected to generate in the order of 309 and 559 vehicle trips respectively in the AM and PM peak hours (including service vehicle trips). When considering that 25 per cent of retail traffic is passing trade and hence while they are included in the total generation, they are not "new" trips on the road network, the development results in 273 and 450 "new" vehicle trips respectively in the AM and PM peak hours.
- The proposed site will have a net increase in vehicle generation of around 132 and 138 new vehicle trips respectively in the AM and PM peak hours compared to existing land uses on site.
- For existing road infrastructure - any potential adverse effects from land use development proposals on road safety and operational efficiency are identified. The project team would work with Transport for NSW and Council to agree operational and physical improvements to the Rawson Street/ Carlingford Road/ Ray Road intersection. Potential measures have been identified which can be accommodated within the existing road configuration, subject to some minor encroachment on the property at 246 Beecroft Road. With these mitigation measures, the key intersections surrounding the site are expected to operate satisfactorily in the weekday peak periods in the scenario without uplift in background traffic growth. In the scenario with uplift in background traffic growth, the right turn from Rawson Street onto Carlingford Road would continue to operate over capacity. Notwithstanding, noting that 70 per cent of existing traffic turning right at this intersection originate from outside the town centre, it is expected that further development of the town centre will merely reduce the appeal of this route as a "rat run" and external vehicles will re-route, ensuring the right turn continues to operate at or near capacity.
- The Rawson Street access is expected to operate well and with spare capacity in both peak periods.
- The proposed traffic anticipated to travel through the key surrounding intersections is expected to be minor, contributing up to three per cent additional traffic compared to existing traffic volumes.
- As part of further planning stages, it is recommended a Resident or Green Travel Plan is prepared to minimise the reliance on single occupancy car journeys to and from the site. Mode share targets should reflect the observed changing behaviour in travel for those living or working within the Epping Town Centre precinct. The development has many of the characteristics required to continue that emerging trend. These characteristics together with commitments to green travel under the guidance of a suitable Green Travel plan should perpetuate growth towards more sustainable forms of travel and achieve identified targets.

- From a transport perspective, the proposed development does not raise specific issues with respect to impacts on the area or transport network nor unnecessarily affect existing land uses. It realises a definitive need for mixed-use developments within Epping Town Centre and encourages a decrease in car dependency and uptake of sustainable transport.

Appendix A. Stakeholder Consultation

A.1 Original Scoping Study

Stantec

Memo

To:	Justin Micallef Oakstand	From:	Chris Wilson Stantec Australia Pty Ltd
Project/File:	301400281/ N210130	CC.:	Ingrid Bissaker Stantec Australia Pty Ltd
Page 1 of:	8	Date:	27 September 2022

Reference: EPPING TOWN CENTRE – TRANSPORT IMPACT REVIEW METHODOLOGY

A key component of development planning in association with land located at 53-61 Rawson Street, Epping, is the traffic and transport impact of the proposal on the local environs and surrounding transport system. Oakstand on behalf of Canjs engaged Stantec to assess the likely transport impacts of the proposed development on the surrounding transport network, as well as understand impacts of other nearby developments within Epping Town Centre, primarily along Rawson Street.

Stantec has carried out on going works and investigations as it relates to understanding the transport issues and opportunities which exist in the Epping Town Centre area. This includes the collation of traffic data recorded between 2019 and 2021, preparation of SIDRA intersection models for existing and future growth year scenarios (2031), site inspections and the completion of a series of virtual consultation meetings with stakeholders (Council and Transport for NSW). Outcomes of works complete to date have been relied upon to inform the depth and breadth of the proposed methodology to evaluate the transport impact of the proposal.

To assist agency evaluation of the re-development proposal, this letter sets out our proposed transport impact assessment methodology including the proposed process, procedures, inputs and selected analytic modelling tools. Stantec is seeking agency support for the assumptions, inputs, process and methodology proposed and described in this letter before proceeding with preparing a detailed Transport Impact Assessment report for submission with the Planning Proposal.

This letter sets out the following:

- Subject site location
- Other relevant Transport Studies
- Development proposal
- Transport modelling methodology, including the process, procedures, inputs and selected analytic modelling tools
- Design development methodology.

Reference: **EPPING TOWN CENTRE – TRANSPORT MODELLING**

1 Subject Site Location

The location of the subject site and immediate surrounds is provided as context at Figure 1.

Figure 1: Site context

Source: Nearmap, accessed August 2022

2 Other Relevant Transport Studies

In November 2014, Stantec (formerly GTA Consultants) prepared a report for Oakstand documenting a review of potential future traffic conditions for the Epping Town Centre Study. At the same time, AECOM also prepared a traffic study for the redevelopment of Epping Town Centre for the Winten Lyon Group. Following receipt of separate submissions from Oakstand and the Winten Lyon Group Parramatta City Council (Council) prepared a Study Brief for a combined traffic impact study to be undertaken by Stantec and AECOM for both sites. The purpose of the joint traffic study was to provide a consistent approach on the assessment of potential future traffic conditions with different development scenarios for Epping Town Centre, including consideration of various land use and access scenarios.

Assumptions on development yields, traffic generation rates and trip reduction rates were submitted to Council and approved in July 2015. Following agreement on these matters, Stantec developed base models in LinSig for each scenario and conducted the assessment.

The assessment[1] involved a comparison of the network and intersection performance statistics of a number of land use scenarios and sub-options for the development, connectivity and road network improvements within Epping Town Centre. Key findings from the assessment include:

- The performance of the Epping Town Centre road network during peak hours is significantly influenced by the very high volumes of regional traffic passing through the Epping Road–Beecroft Road–Carlingford Road corridor.

[1] Proposed Epping Town Centre Redevelopment, Rawson Street Epping, Traffic Study Issue A, GTA Consultants reviewed by AECOM, dated 24 November 2015

- Presently the intersections of Carlingford Road/Beecroft Road and Rawson Street/Carlingford Road operate beyond capacity. The Epping Town Centre relies on Rawson Street as its principal access and accordingly the situation is becoming untenable with the high levels of traffic congestion restricting proper access.
- The development of Epping Town Centre under Council's DCP controls is forecast to generate approximately the same level of PM peak traffic (1,000 vehicles per hour) as currently experienced. This is because traffic generated by the proposed residential apartments would be offset by a reduction in commercial floor space.
- The overall performance of the network resulting from the various land use scenarios investigated, as indicated by average vehicle delays, fall within a relatively narrow range. This is mainly due to the situation in Epping Town Centre that the differences between the various land use scenarios become relatively minor in comparison with the very high volumes of regional traffic passing through during peak periods.

3 Development Overview

The proposed redevelopment will comprise a mixed use development including residential, retail and commercial land uses. The proposed land uses are summarised in Table 1.

Table 1: Development scheme

Land Use	Land Use Scale
Residential	420 units
Office	1600 sqm GFA
Supermarket	3200 sqm GFA
Specialty Retail	4340 sqm GFA

Key transport elements of the development will include:

- basement car park and loading dock, with vehicular access provided from Rawson Street
- high-quality pedestrian experience with improved site permeability and pedestrian amenity ensured by way of expanded public domains, enhanced connectivity to the Rawson Street car park future development site, and strengthening desire lines to Epping Town Centre/ Railway Station.

A key strategic merit of the development is the opportunity to promote sustainable travel given the high-density mixed-use nature of the development within a strategic centre; and within 200 metres of a rail interchange that provides convenient access to local and regional residential, commuter, retail and recreational centres.

In addition, the integrated land uses provided across Epping Town Centre generally (existing, approved and future development) provide opportunities for co-location of jobs, housing and retail, providing opportunity to contain trips internally to Epping thereby minimising external traffic and continue to facilitate evenly split bi-directional trips for more equitable utilisation of public transport services and road infrastructure in and out of Epping Town Centre across the day.

4 Transport Modelling Methodology

Traffic Data Collection and Study Area

To date, weekday AM and PM peak hour traffic turning movement surveys have been commissioned at intersections within the vicinity of the subject site, including:

1. Carlingford Rd & Beecroft Rd
2. Carlingford Rd & Rawson St & Ray Rd
3. Carlingford Rd & Cliff Rd
4. Carlingford Rd & Bridge St.

Queue length surveys and Origin Destination surveys of the right turn at the Carlingford Road/ Rawson Street/ Ray Road intersection were also commissioned.

All data was collected on Thursday, 24 June 2021. Sydney was at this time, on the brink of returning into a partial and then full lock down due to COVID 19. SCATS traffic volume data was therefore procured at the above intersection location 1 and 2 for Wednesday 16 and Thursday 17 June 2021 and Thursday, 13 June 2019. This data has been compared to the surveys and it was found traffic volumes on 24 June 2021 were generally lower than volumes recorded on 16, 17 June 2021 and 13 June 2019. Further, there was only one per cent variance in peak period traffic volumes recorded on 16, 17 June 2021 and 13 June 2019. As such, for SIDRA modelling completed to date, the existing condition has adopted traffic volumes based on the Wednesday 16 June 2021 SCATS traffic volume data, with the relative split of each turning movement determined based on the recent survey data where required.

To understand changes to traffic patterns throughout Epping Town Centre between 2019 to 2022, additional traffic surveys are proposed to be undertaken at the abovementioned intersections.

To assist in preparing traffic generation and distribution assumptions, traffic surveys are proposed to be undertaken at the following additional site access points along Rawson Street:

1. 53-61 Rawson Street
2. Rawson Street Car Park.

We will require direction from agencies on whether to use current counts (2022) or pre covid counts (2019) as the basis of our existing conditions SIDRA assessment.

Historical SCATS phasing data has also been obtained from TfNSW for the relevant periods to assist with calibrating the model.

Traffic Generation Rates

The traffic generation rates proposed to be adopted for the retail and commercial uses are summarised at Table 2, noting that the tabulated values have previously been agreed with Council during preparation of the Joint Traffic Study (Stantec, AECOM, 2015).

Table 2: Trip Generation Rates - Agreed with Council

Land Use	AM Peak Traffic Rate	PM Peak Traffic Rate
Retail – supermarket	4.5 per 100m2 GLFA	13.5 per 100m2 GLFA
Retail – specialty	1.3 per 100m2 GLFA	4.0 per 100m2 GLFA
Commercial	1.1 per 100m2 GFA (1.467 per 100m2 GLFA)	0.5 per 100m2 GFA (0.667 per 100m2 GLFA)

Residential traffic generation rates similar to those that have been surveyed in high density centres around public transport nodes such as Parramatta, Chatswood and St Leonards will be adopted.

Trip Generation Reduction Factors

Traffic generation reduction factors proposed to be adopted for the development are summarised at Table 3, noting that the tabulated values have previously been agreed with Council during preparation of the Joint Traffic Study (Stantec, AECOM, 2015).

Table 3: Trip Generation Reduction Factors – Agreed with Council

Land Use	Discount Rate	Description
Trip Containment	20% retail trips 10% commercial trips	The proposed land use mix within the Epping Town Centre development reflects a sizeable resitdentail base that would contribute towards walk trips to/ from retail and commercial developments within a 400 metre radius area. This will be facilitated with urban design and public domain features that enhance the walking environment. These reflect opportunities for trip containment and total trip generation of retail and commercial developments in town centres could be reduced.
Passing Trade	25% of retail trips on Carlingford Road – Beecroft Road – Epping Road	The Guide to Traffic Generating Developments (RTA, 2002) suggests retail trip discounts of up to 25% for GLFAs less than 10,000 square metres, decreasing to 15% for GLFAs over 30,000 square metres, to account for the incidence of linked and multi-purpose trips. Given the likely land use mix proposed for Epping Town Centre, approximately 25% of retail trips are made by vehicles already passing by on Carlingford Road-Beecroft Road-Epping Road. These trips are included in the total generation but are not "new" trips on the road network; they are simply diverted from the passing traffic into the development and back out. The analysis for the proposed retail areas for the town centre would also likely reflect this. It is thus proposed that a 25% passing trade discount be applied for traffic on the Carlingford Road-Beecroft Road-Epping Road route
Increased public transport availability (2026)	77.8%	The Epping Town Centre Study (Halcrow, 2011) suggests that car trips are reduced by applying a factor of 0.778. This has been derived by dividing the current mode share of public transport use (35%) by the target future public transport mode share (45%) ie. 35/45 = 0.778. The Halcrow 2011 study has been the subject of multiple discussions and sign-offs from Parramatta Council, Transport for NSW and the Department of Planning. In the longer term, an overall discount of 0.778 has been applied to reflect incentives to reduce car usage.

Traffic Assignment and Distribution

A summary of the traffic assignment (in/out) splits proposed to be adopted for the traffic analysis are provided at Table 4. These are considered to be consistent with typical travel behaviour in Sydney.

Table 4: Proposed Assignments by Land Use

Land Use	AM Peak	PM Peak
Retail	50% inbound 50% outbound	50% inbound 50% outbound
Commercial	90% inbound 10% outbound	10% inbound 90% outbound
Residential	20% inbound 80% outbound	80% inbound 20% outbound

Further to estimated assignments, traffic associated with the development will be distributed across the network by drawing on the following data:

- Traffic survey volumes proposed to be collected at the existing site access to Rawson Street
- Traffic survey volumes proposed to be collected collected at the Rawson Street car park access
- Origin Destination survey data collected along Rawson Street in 2021
- STFM Select Link Analysis data proposed to be collected from Transport for NSW
- Journey to Work data collected from the Australian Bureau of Statistics.

Selected Intersection Modelling Software

The study review will rely on the use of SIDRA 9.0 intersection modelling software. This software will be used to assess the performance of individual intersections on the assessed transport network for a range of operable scenarios and periods. Modifications to any default operating parameters will be set out in the broader technical document proposed to accompany the application. Using this software, each intersection will be coded as a network.

Background Traffic Growth

Transport for NSW traffic volume viewer count stations along Beecroft Road and Epping Road shows that background traffic volumes have had no discernible growth. The location of each counter is illustrated in Figure 2, with respective AM and PM peak hour traffic volumes illustrated at Figure 3 and Figure 4 for Beecroft Road and Figure 5 and Figure 6 for Epping Road.

Figure 2: Location of Permanent Traffic Counters

Source: Transport for NSW Traffic Volume Viewer, accessed August 2022

Figure 3: Beecroft Road AM Peak (Traffic Counter 74229)

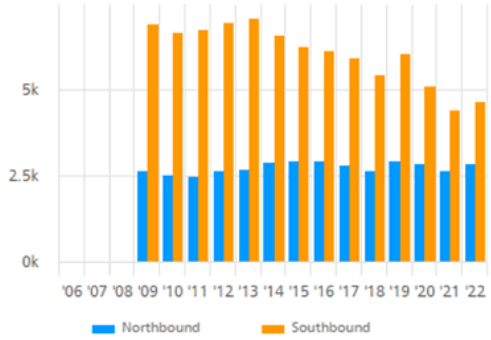


Figure 4: Beecroft Road PM Peak (Traffic Counter 74229)

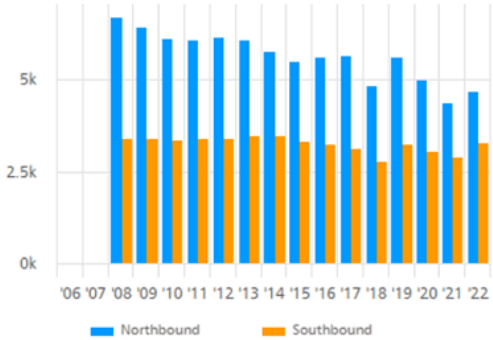


Figure 5: Epping Road AM Peak (Traffic Counter 74453)

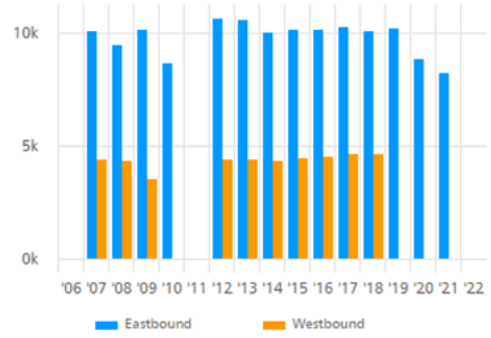
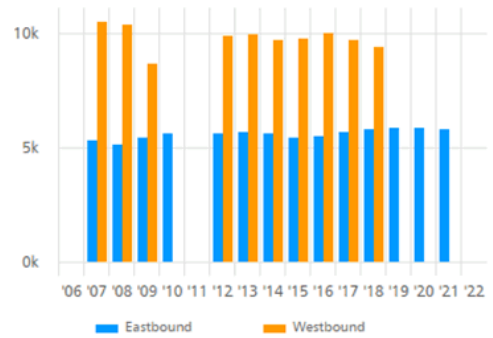


Figure 6: Epping Road PM Peak (Traffic Counter 74453)



While Epping Town Centre has experienced an uplift in development over this period, traffic volumes on key arterial roads surrounding the centre have either experienced no discernible growth or else reduced. This indicates that through traffic has been squeezed out from the centre to travel on alternate routes, such as the M2.

The centre is the most appropriate place to develop given opportunity to promote sustainable travel due to proximity to a major public transport mode and to facilitate trip containment through co-location of jobs, housing and retail. The diversion of through traffic to more appropriate routes through increased development within Epping Town Centre and associated traffic loading on the local road network, is entirely appropriate given its role as a strategic centre and encourages more equitable utilisation of public transport services and road infrastructure in and out of Epping Town Centre.

The additional traffic turning movement surveys proposed to be undertaken will be used to assess traffic patterns throughout Epping Town Centre and understand any such growth (or otherwise) of traffic volumes. This analysis will inform the background traffic growth assumptions to be adopted.

Transport Modelling Scenarios

Following confirmation of background traffic growth assumptions, the following modelling scenarios are proposed to be completed in association with the any analysis.

Table 5: Scenario analysis for modelling traffic impacts

No.	Scenario	Description
1	Existing Condition	Agencies to confirm data to use for base year (2019 or 2022)
2	Project Case or Post Development Condition	Scenario 1 including allowance for redevelopment
3	Epping Town Centre Development Uplift Condition	Scenario 2 including allowance for uplift of development throughout Epping Town Centre generally

It is observable that the Epping Road railway overbridge is processing high levels of regional traffic during peak periods with limited opportunity to provide road network improvements. Given the development will contribute minimal additional traffic when compared to the existing high levels of regional traffic demand, it is not expected to exacerbate operating conditions at this location. This is demonstrated through reference to historic traffic counts that show no discernible growth in traffic over the years despite substantial development in Epping.

5 Development Methodology

Transportation access and precinct integration principles for the project will be established on all transport modes including vehicles, pedestrian and cyclists, ensuring alignment with strategic plans and collated background information for the area over the last 10 years.

The study will examine appropriate vehicular access arrangements, having regard to the service lane as set out in the Parramatta Development Control Plan 2011, requirements for service vehicles, integration with surrounding developments, while also ensuring a high level of pedestrian domain space with distinct permeability and pedestrian amenity along Rawson Street.

The development will adopt car parking rates that ensure a balanced and equitable supply, having regard to rates as set out in Parramatta Development Control Plan 2011. Bicycle parking and end of trip facilities will be designed such that they are easy and convenient to access, to encourage use and promote sustainable travel objectives.

The study will assess the uplift in person trips generated by the development and review transport data available for the precinct which sets out historic patterns in transport travel for residents and employees to estimate uplift in trips expected for each mode of travel. The study will consider the broader qualitative transport implications associated with the proposed development on the public transport network surrounding site.

A Green Travel Plan (GTP) is a tool that the development could use to manage the transport mode choices of their staff, residents and visitors. The study will provide an overview Green Travel Plan to demonstrate how the development could promote and encourage sustainable travel and reduce reliance on private vehicle.

A.2 Transport for NSW Reply to Scoping Study (March 2023)

Transport for NSW

29 March 2023

TfNSW Reference: SYD23/00169/01

Ms Gail Connolly
Chief Executive Officer
City of Parramatta
Po Box 32
Parramatta NSW 2124

Attention: Belinda Borg

SCOPING PAPER (PRE-PLANNING PROPOSAL)
MIXED USE DEVELOPMENT
53-61 RAWSON STREET, EPPING

Dear Ms Connelly

Reference is made to Paramatta City Council's correspondence of 13 February 2023 seeking comment from Transport for NSW (TfNSW) on the scoping paper for pre-Planning Proposal for a mixed-use development at 53-61 Rawson Street, Epping.

TfNSW has reviewed the submitted documentation and recommends Council, as the relevant Planning Authority, should consider the need for a 'Transport Study' to better understand the cumulative traffic and transport impacts associated with the potential increase in development yields beyond current land use forecasts of the Epping Town Centre. The 'Transport Study' should consider and identify required transport infrastructure and travel demand management to support the increased growth as well as an implementation strategy, including timing, land components, costings, delivery responsibilities, and funding mechanisms.

Further details regarding the need to consider a cumulative traffic and transport study is outlined in TfNSW's previous correspondence to Council dated 17 August 2022.

In addition to the above, TfNSW provides detailed comments on the scoping study in **TAB A**, which should be considered as part of any transport study undertaken for the proposed development.

Should you have any questions or further enquiries in relation to this matter, please don't hesitate to contact Senior Land Use Planner, Andrew Popoff, via phone on 0413 459 225 or by email: andrew.popoff@transport.nsw.gov.au.

Yours sincerely

Brendan Pegg
A/Director Land Use
Planning and Programs, Greater Sydney Division

27-31 Argyle Street Parramatta NSW 2150
PO Box 973 Parramatta CBD NSW 2124
W transport.nsw.gov.au

TAB A – Detailed TfNSW comments on scoping study

Traffic data collection and study area

- The following intersections should be modelled below as a network model (SIDRA 9):
    - Carlingford Road / Beecroft Road (TCS)
    - Carlingford Road / Rawson Street / Ray Road (TCS)
    - Carlingford Road / Cliff Road
    - Carlingford Road / Midson Road (TCS)
    - Rawson Street / Bridge Street
    - Epping Road / Blaxland Road / Beecroft Road (TCS)
- Traffic counts and other related data (i.e., queue length surveys, etc) to facilitate a calibrated and validated base model should be based off the latest 2023 count information. TfNSW is willing to assist in the provision of the latest SCATS data for the abovementioned signal sites. The proponent's Transport Consultant should obtain SCATS data via scats.traffic.signal.data@transport.nsw.gov.au.

Traffic generation rates

- TfNSW has previously conducted Trip Generation Surveys for small suburban shopping centres (i.e. < 10,000m2 GLFA). The report can be found on the OpenGov website via the following link below:https://www.opengov.nsw.gov.au/searches?query=*Trip+Generation&titleOnly=on&agencyId=28237&typeId=+&fromDate=&toDate=&size=&page.The same Traffic Generation Rates should be used for both the Retail-Supermarket and the Retail-Specialty.

  TfNSW raise no objections to the suggested memo rates for Retail as follows:
    - AM Peak = 4.5 trips per 100m2 GLFA
    - PM Peak = 13.5 trips per 100m2 GLFA
- Based off Census 2016 mode share data for the suburb of Epping, the high-density residential traffic generation rates to be used should be the Sydney average rates from the TfNSW Technical Direction (TDT 2013/04a) which is:
    - AM Peak = 0.19 trips per unit
    - PM Peak = 0.15 trips per unit
- The Sydney average commercial traffic generation rates used from the TfNSW Technical Direction (TDT 2013/04a) equate to the following:
    - AM Peak = 1.6 trips per 100m2 GFA
    - PM Peak = 1.2 trips per 100m2 GFA
- These rates above are based off a 63% car driver mode share. However, noting that the 2016 Census data for the suburb of Epping had a car driver mode share of around 44%, the commercial Rates to be used should be benchmarked against the Chatswood Commercial Survey Site which has a similar car Driver Mode Share as follows:
    - AM Peak = 1.03 trips per 100m2 GFA
    - PM Peak = 0.84 trips per 100m2 GFA

Trip generation reduction factors

- TfNSW has no issues in the usage of the trip containment and passing trade discount rates suggested within Table 2 of the Stantec memo. However, TfNSW does not support the multiplying factor of 0.778 to be applied to car trips (i.e., > 20% reduction in car trips) as the above traffic generation rates already factor high level of public transport accessibility.

STFM plot data

- TfNSW has no issues with providing such data on request for the purposes of modelling. However, please be advised that the proponent's transport consultant may be required to pay for such information and will also be required to fill out and sign an EMME data access agreement form.

Scenario analysis

- Further discussions will be required later to resolve details and / or assumptions associated with the scenario No 3 (Epping Town Centre Development Uplift).

General transport study comments

- With the diversity of mix of uses proposed on the development site (including residential, commercial, and retail) the proposed development should encourage sustainable modes of transport such as walking, cycling and the use of public transport to key destinations.

  The Planning Proposal should include Traffic, Transport and Parking Study to investigate likely travel mode demands and investigation on systems to minimise impact to the surrounding classified and local road networks.

  TfNSW recommends that the key items of investigation for the Traffic, Transport and Parking Study are to include, but not be limited to:

  - Vehicular Traffic
    - Detailed assessment, including traffic survey and future modelling scenarios during peak periods of the surrounding road network to identify the suitability of required improvements to the road network to facilitate the Planning Proposal and to consider cumulative impacts from existing and planned surrounding developments.
  - Active Transport
    - Provision of end of trip facilities to encourage and support workers within the Planning Proposal in active transport options.
    - Identify specific walking and cycling infrastructure projects that may be delivered by developer contributions.
  - Loading and Servicing
    - Investigate opportunities to facilitate loading and servicing facilities off-street and provide separation for private vehicles and pedestrian activity for improved safety. Details should align with relevant guidelines (eg. TfNSW Freight and Servicing Last Mile Toolkit).
  - Parking
    - Investigate opportunities for car share systems within the Planning Proposal to support businesses and residents to reduce private vehicle dependency. The study should identify the locations and provision of such services.

A.3 Stantec Response to Transport for NSW (June 2023)

Stantec

Memorandum

Project:	**53-61 Rawson Street, Epping**	**Office:**	Sydney, St Leonards
Project №:	301400281/ N210130	**Status:**	Final
Client:	Canjs c/o Oakstand	**Prepared by:**	Ingrid Bissaker
Date:	15 June 2023	**Approved by:**	Chris Wilson
Subject:	**Transport Impact Review Methodology - Response to Transport for NSW Advice**		

The following memorandum has been prepared in response to Transport for NSW's (TfNSW) detailed comments on the proposed transport impact assessment methodology for a mixed-use development at 53-61 Rawson Street, Epping. The memorandum specifically seeks concurrence from Transport for NSW on the proposed speciality retail traffic generation rates, and proposed traffic growth assumptions.

For reference, the proposed transport impact assessment methodology and TfNSW detailed comments/ response are respectively provided in Appendix A and B of this memorandum.

The memorandum is set out as follows:

- Traffic generation rates
- Trip generation reduction factors
- Background traffic growth.

Traffic Generation Rates

The traffic generation rates agreed with TfNSW for adoption in the assessment are summarised at Table 1.

Table 1 – Traffic generation rates agreed with TfNSW

Land Use	AM Peak Traffic Rate	PM Peak Traffic Rate
Residential	0.19 trips per unit	0.15 trips per unit
Retail – supermarket	4.5 per 100m2 GLFA	13.5 per 100m2 GLFA
Commercial	1.03 per 100m2 GFA	0.84 per 100m2 GFA

In addition to uses outlined in Table 1, Stantec note the development also proposes a minor allowance for specialty retail shops. The proposed traffic generation rates for speciality retail use are reproduced in Table 2.

Table 2 – Proposed traffic generation rates not specifically addressed by TfNSW

Land Use	AM Peak Traffic Rate	PM Peak Traffic Rate
Retail – specialty	1.3 per 100m2 GLFA	4.0 per 100m2 GLFA

Stantec seek Transport for NSW concurrence on proposed traffic generation rates for speciality retail use.

Trip Generation Reduction Factors

The trip generation reduction factors agreed with TfNSW are outlined in Table 3.

Table 3 –Trip generation reduction factors – agreed with TfNSW

Land Use	Discount Rate	Description
Trip Containment	20% retail trips 10% commercial trips	Agreed with Transport for NSW
Passing Trade	25% of retail trips on Carlingford Road – Beecroft Road – Epping Road	Agreed with Transport for NSW
Increased public transport availability (2026)	None	Discount rate removed following Transport for NSW correspondence

Stantec

301400281/ N210130
53-61 Rawson Street, Epping

Background Traffic Growth

When undertaking a traffic and transport assessment of a new development proposal, it is normal to consider a future scenario that considers regional and other traffic growth and the ultimate functioning for the transport network.

Stantec are proposing a departure from this approach given the capacity constraints of the Epping Town Centre road network. Agreement in principle to this departure is sought from TfNSW for adopting zero growth in regional traffic through the Epping Town Centre.

Supporting evidence for a zero regional growth scenario will be fully documented in the Traffic and Transport assessment however a summary of the evidence is herewith presented.

TfNSW traffic volume viewer count stations along Beecroft Road and Epping Road shows that background traffic volumes have had no discernible growth for more than a decade. The location of each counter is illustrated in Figure 1, with respective AM and PM peak hour traffic volumes illustrated at Figure 2 and Figure 3 for Beecroft Road and Figure 4 and Figure 5 for Epping Road.

Figure 1 – Location of permanent traffic counters

Source: Transport for NSW Traffic Volume Viewer, accessed August 2022

Figure 2 – Beecroft Road AM Peak (Traffic Counter 74229)

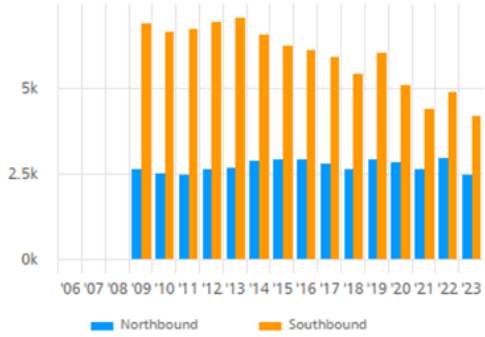


Figure 3 – Beecroft Road PM Peak (Traffic Counter 74229)

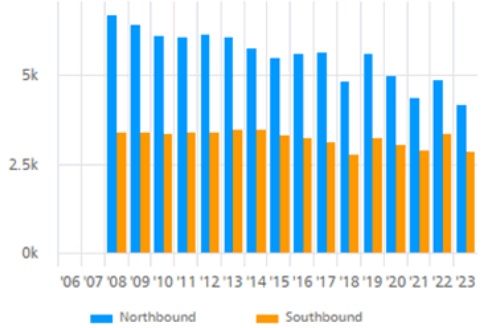


Figure 4 – Epping Road AM Peak (Traffic Counter 74453)

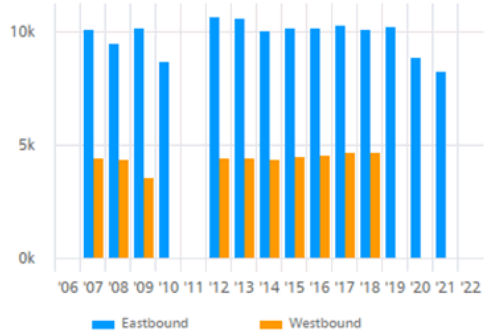


Figure 5 – Epping Road PM Peak (Traffic Counter 74453)

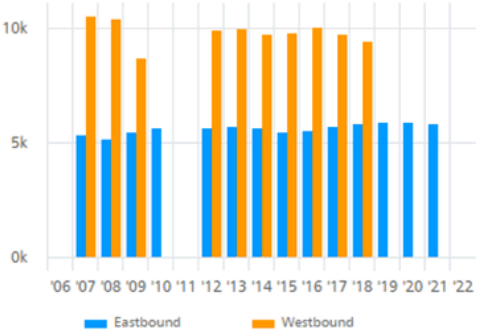


Figure 2 and Figure 3 for Beecroft Road and Figure 4 and Figure 5 for Epping Road indicates that the 10 year traffic growth has been negligible or declined.

Given Epping Town Centre has experienced a significant uplift in development over this period, it is evident that the capacity constraints of the key intersections in Epping Town Centre have displaced through traffic to other regional routes to accommodate newly generated within the centre. This is not unlike other capacity restrained centre in Sydney metropolitan area such as Chatswood Town Centre and the capacity constrained Pacific Highway.

Further review of traffic data collated along Carlingford Road between 2019 and 2023 indicates there has been no change in traffic volumes and further, that COVID 19 has had no impact. Supporting data will be provided in our traffic report when submitting with the planning proposal.

Any additional traffic from developments along Rawson Street will simply continue to displace regional through traffic as it has done. Stantec is therefore seeking TfNSW to agree to this and that modelling a future scenario with background traffic growth is not reality.

A conservate approach would be to consider additional traffic generation additive to the current situation.

With this in mind, the three scenarios proposed to be assessed are outlined in Table 4.

Table 4 – Scenario analysis for modelling traffic impacts

No.	Scenario	Description
1	Existing Condition	
2	Project Case or Post Development Condition	Scenario 1 including allowance for redevelopment additive to current conditions. No allowance for background traffic growth.
3	Epping Town Centre Development Uplift Condition	Scenario 2 including allowance for uplift of development throughout Epping Town Centre generally, additive to current conditions. No allowance for further background traffic growth.

A.4 Transport for NSW Response to Stantec (July 2023)

Transport for NSW

23 July 2023

TfNSW Reference: SYD23/00169/02

Mr Chris Wilson
Director
Stantec
Level 9, 203 Pacific Highway
St Leonards NSW 2065

Attention: Ingrid Bissaker

PRE-PLANNING PROPOSAL – SCOPING PAPER
MIXED USE DEVELOPMENT
53-61 RAWSON STREET, EPPING

Dear Mr Wilson

Reference is made to Stantec's correspondence of 15 June 2023 seeking additional comment from Transport for NSW (TfNSW) regarding the agency's previous correspondence to Council dated 29 March 2023 (Reference: SYD23/00169/01) on the scoping paper for a Pre-Planning Proposal for mixed-use development at 53-61 Rawson Street, Epping.

TfNSW has reviewed the submitted documentation that covers the following matters:

- Proposed specialty retail traffic generation rates.
- Proposed future year regional background traffic growth assumptions.

TfNSW provides detailed comments on the documentation within **TAB A**, which should be considered as part of any transport study undertaken for the proposed development.

Should you have any questions or further enquiries in relation to this matter, please don't hesitate to contact Senior Land Use Planner, Andrew Popoff via phone on 0413 459 225 or email: Andrew.Popoff@transport.nsw.gov.au.

Yours sincerely

Brendan Pegg
Acting Director Land Use
Planning and Programs, Greater Sydney Division

Cc: Belinda Borg – City of Parramatta Council

27-31 Argyle Street Parramatta NSW 2150
PO Box 973 Parramatta CBD NSW 2124
W transport.nsw.gov.au

TAB A – Detailed TfNSW comments

Traffic Generation Rates

TfNSW notes that the proposed Retail – Specialty rates within the Stantec Memo seem to be based off the Thursday PM Peak multiple regression equation within Section 3.6.1 – Shopping Centres of the Guide to Traffic Generating Developments. TfNSW does not support the use of this multiple regression equation where all the other parts of this equation are set to zero (except the specific part seeking a trip generation rate). As such, TfNSW does not support the use of the following Retail – Specialty rates of:

- AM Peak = 1.3 trips per 100m2 GLFA
- PM Peak = 4.0 trips per 100m2 GLFA

Whilst TfNSW acknowledge that our previous correspondence raised no objections to the following Retail – Supermarket rates as follows:

- AM Peak = 4.5 trips per 100m2 GLFA
- PM Peak = 13.5 trips per 100m2 GLFA

TfNSW previous correspondence stated that the agency had conducted Trip Generation Surveys for Small Suburban Shopping Centres (i.e., < 10,000m2 GLFA) and that the same traffic generation rates should be used for both the Retail – Supermarket and the Retail - Specialty. This report can be found on the OpenGov website via the following link below:
https://www.opengov.nsw.gov.au/searches?query=*Trip+Generation&titleOnly=on&agencyId=28237&typeId=+&fromDate=&toDate=&size=&page
Therefore, TfNSW advises that the Traffic Generation Rates adopted should be for the total GLFA of the (Supermarket + Specialty Retail) uses within this site and be based off the rates provided within the abovementioned Small Suburban Shopping Centres Analysis report – consider Section 4.3.1.

Future Year Regional Background Traffic Growth

The count station on Beecroft Road (74229) is north of the M2 interchange and is too far away to confirm whether there has been traffic growth on the arterial road system through the Epping Town Centre.
Whilst a stronger case can be made for the use of the Epping Road count station (74453), the count data for 2020 and 2021 is questionable due to the COVID-19 Pandemic. Another factor which would be limiting historical traffic growth at this count station is the fact that the intersection of Epping Road / Langston Place / Blaxland Road / Beecroft Road has been and still is a known network pinch point to access the Epping Town Centre, particularly during the AM / PM peak periods.
As provided on the websites linked below, the road bridge over the rail line will be widened in the short-term future to provide additional capacity at this pinch point. Once this upgrade is completed, that there would be some future traffic growth here (i.e., due to capacity increase of this pinch point).

- https://minister.infrastructure.gov.au/c-king/media-release/epping-bridge-project-concept-design-and-early-work-tender-awarded

- https://caportal.com.au/tfnsw/tiip/pipeline

As such TfNSW would not be supportive of Stantec's request to assume zero regional background traffic growth for their modelling of future years. The agency advises that TPZ2022 within the Sydney Strategic Transport Model (STM) has recently been released and includes post covid travel behaviours, such as flexible working arrangements and working from home a few days per week for white collar professionals. While TPZ2022 provides an increase in background traffic demand it is less than the previous projections identified in TPZ2019 that was based on pre-Covid travel behaviours. Such regional background traffic growth information to inform Stantec's future year modelling should be obtained from TfNSW's Sydney Traffic Forecasting Models (STFM).

Please be advised that Stantec will be required to sign an EMME Data Access Agreement Form.

A.5 Stantec Response to Transport for NSW (August 2023)

Stantec Australia Pty Ltd
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Tel: +61 2 8484 7000
ABN 17 007 820 322 www.stantec.com/au

23 August 2023

Enquiries: Chris Wilson
Project No: 301400281

Transport for NSW
27-31 Argyle Street
PARRAMATTA NSW 2150

Attention: Andrew Popoff (Senior Land Use Planner)

Dear Andrew

RE: 53-61 Rawson Street, Epping
Transport Impact Review Methodology - Response to Transport for NSW Advice

Thank you for taking my call last week and appreciate the time you gave to discuss aspects of the letter received from Transport for NSW's (TfNSW) letter dated 23 July 2023[1]. As foreshadowed, I formally respond to two directions that TfNSW set out in its letter that we, Stantec, are not in total agreement with.

While appreciating that TfNSW directions are normal protocol for assessing traffic and transport impacts of urban developments, we do however contend that the locational circumstances of this site have not been fully appreciated.

Accordingly, this letter provides key responses to Transport for NSW stated position on retail traffic generation rates and traffic growth assumptions. Our Transport Impact Assessment Report to be lodged by our client with Parramatta City Council this coming week will expand on these matters together with providing supporting information.

The letter is set out as follows:

- Retail traffic generation rates
- Background traffic growth.

For reference, the proposed retail traffic generation rates and traffic growth assumptions proposed by Stantec and TfNSW detailed response on these items are provided in Appendix A of this letter.

1. Retail Traffic Generation Rates

TNSW have requested the development adopts a combined traffic generation rate for the retail assets, being supermarket and specialty retail, based on rates detailed in the Small Suburban Shopping Centres Analysis report ("Analysis Report") prepared by Bitzios on behalf of Transport for NSW dated 7 November 2018.

A detailed review of the retail rates as set out in the Analysis Report will be provided in the Transport Impact Assessment supporting the Planning Proposal. In summary, based on this review Stantec highlight the following:

- majority of the sites are set in a different transport and land use environment when compared to the development site in Epping Town Centre, noting a key criterion for the selection of sites surveyed as part of the Small Suburban Shopping Centres Analysis was the ease in isolating the site from other developments (other businesses outside the shopping centre). This resulted in:
  - majority of the developments were located proximate to low density residential land uses
  - majority of developments were located with limited or restricted co-location of other retail / commercial developments
  - majority of developments had significantly less public transport accessibility than Epping Town Centre which is located on a major transport interchange node.
- the traffic generation rates have been derived based on the site peak hour rather than the surrounding road network peak hour. Section 3.2.2 of the Guide to Traffic Generating Developments (Transport for NSW, 2002) states that

[1] Pre-Planning Proposal – Scoping Paper, Mixed Use Development, 53-61 Rawson Street, Epping, TfNSW Reference SYD23/00169/02, letter from Brendan Pegg to Christopher Wilson, dated 23 July 2023

the traffic generation for the peak activity time of the adjacent road network is possibly more important period [than the peak activity time of the development itself] as it is used to assess the effect of the development on the road system.

As such, the traffic generation rates are not considered comparable to characteristics expected in Epping Town Centre during the road network peak hours and the sites close proximity to public transport interchange (bus/metro/rail) and hence the assessment has adopted alternate retail rates agreed with Council as documented to date and summarised at Table 1.

Table 1 – Traffic generation rates agreed with Council

Land Use	AM Peak Traffic Rate	PM Peak Traffic Rate
Retail – supermarket	4.5 per 100m2 GLFA	13.5 per 100m2 GLFA
Retail – specialty	1.3 per 100m2 GLFA	4.0 per 100m2 GLFA

Application of these rates to the indicative development scheme results in the site generating 183 and 552 vehicle trips in each peak period. Assuming 20 per cent trip containment for retail uses as agreed with Transport for NSW, the site generates 146 and 441 vehicle trips in each peak period.

When benchmarking the site traffic generation against surveyed traffic generating characteristics for the Coles and adjacent Council car parks of 170 and 509 vehicle trips in each peak hour, it is clear the adopted traffic generation rates are appropriate.

2. Traffic Growth

As already discussed in our previous correspondence with TfNSW, Stantec are proposing a departure from this approach given the capacity constraints of the Epping Town Centre road network and decade of flat traffic growth. Notwithstanding, the proposal does include an allowance for uplift of development throughout Epping Town Centre generally, additive to current conditions. The developments considered in the assessment include:

- 242-244 Beecroft Road, Epping (SSD-8784, SSD-8784-Mod-1, SSD-31576972)
- 245-250 Beecroft Road, Epping (DA/653/2022, PPSCC-387)
- 37-41 Oxford Street, Epping (DA/314/2017, DA/314/2017/A, DA/1/2022)
- 59 Beecroft Road, Epping (DA/944/2021, PPSSCC-292, [2022] NSWLEC 1705)
- 48 - 54 Beecroft Road, Epping (DA/61/2018/A, PPSSCC-365).

Transport for NSW have requested the development adopts regional traffic growth in accordance with Sydney Transport Forecasting Model (STFM), noting the following reasons:

- Epping Road / Langston Place / Blaxland Road / Beecroft Road intersection upgrade will increase capacity on the road network
- The traffic count station along Beecroft Road is too far from Epping Town Centre, and count station along Epping Road short term (2020 and 2021) results are not reliable due to COVID-19
- Sydney Transport Model (STM) has been revised to account for post-covid travel behaviours.

Stantec provide the following responses to these items.

Epping Road/ Langston Place/ Blaxland Road / Beecroft Road intersection upgrade

In April 2023, Transport for NSW awarded Mott MacDonald Australia the contract to develop the concept design, prepare the Review of Environmental Factors, manage early investigation work, and provide technical advice for the proposed upgrade.

Notwithstanding, while the proposed upgrades have been discussed for more than 30 years, they have never eventuated. It is understood that the potential material adverse effect to patronage on M2 Motorway is a key issue for owners and operators of the motorway, and with this issue continuing to be unresolved and hence impacting the practicality of this project proceeding.

Further, even with the upgrades, there remains further pinch points on the road network that will limit uplift in regional traffic growth. As it relates to Epping Town Centre, the pinch point will merely shift from the Epping Road/ Langston Place/ Blaxland Road / Beecroft Road intersection to the Beecroft Road/ Carlingford Road intersection which currently operates at its full capacity during peak periods.

Further assurance that this project will proceed, and indicative timelines, would be required to incorporate any impacts into traffic modelling for the proposed development.

Transport for NSW Traffic Volume Viewer

The benefit of using the Traffic Volume Viewer is that it presents results from a significantly larger sample size over a longer time scale, compared to reviewing point in time traffic count data, and therefore presents a true understanding of traffic growth.

Notwithstanding, Stantec has also previously obtained SCATs traffic count data from Transport for NSW at the Carlingford Road/ Rawson Street and Carlingford Road/ Beecroft Road intersection for Thursday, 13 June 2019 and Thursday, 18 May 2023.

A review of the 2019 and 2023 SCATS data indicates that during the identified peak hour periods (7:30 am to 8:30 am, and 4:15 pm to 5:15 pm respectively), traffic volumes had increased by 0.53 per cent per annum in the AM peak hour and had reduced by 0.25 per cent per annum in the PM peak hour. Notwithstanding, a review of 2019 and 2023 traffic volumes across the broader AM and PM peak periods is contained in Figure 1 and Figure 2.

Figure 1 – Traffic growth – 2019 to 2023 AM peak period

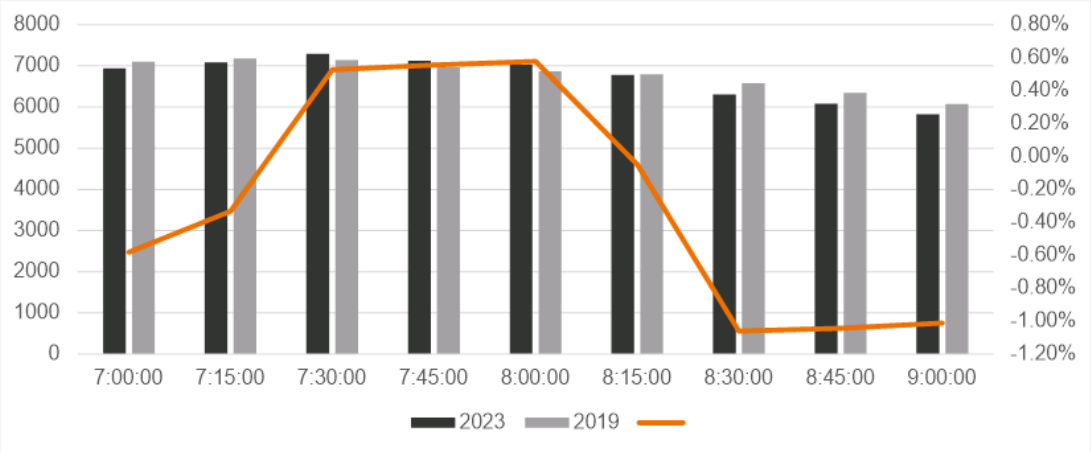
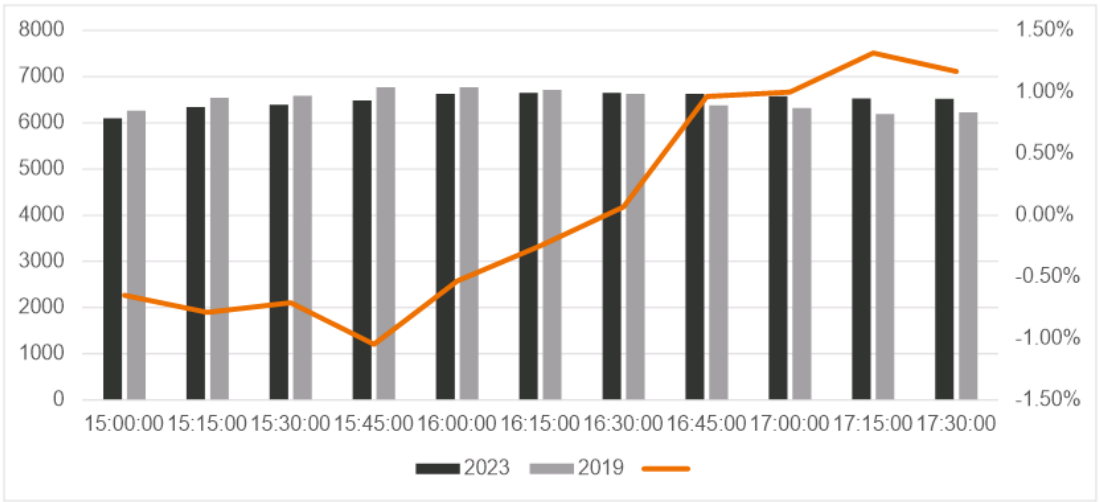


Figure 2 – Traffic growth – 2019 to 2023 PM peak period



As shown, the AM peak has a consistent peak period between 7:00am to 9:00am with minimal variation in total vehicles on the road network. Total traffic volumes for this period have reduced by a negligible 0.01 per cent per annum between 2019 and 2023. As such, there is ultimately no distinct pattern of traffic growth between 2019 and 2023, consistent with outcomes from the Transport for NSW traffic volume viewer.

Stantec

301400281
53-61 Rawson Street, Epping

The PM peak had a more distinct peak period in 2019 for hour periods starting at 3:45pm, 4:00pm and 4:15pm, with greater total traffic than recorded in 2023, with traffic volumes dropping off after this period, whereas the 2023 period had a smoother peak period with less variance in traffic volumes across the period. This indicates that traffic demand has smoothed out and spread across the peak period, with no actual discernible growth in traffic, consistent with outcomes from the Transport for NSW traffic volume viewer.

With this in mind, any additional traffic from developments along Rawson Street will simply continue to displace regional through traffic as it has done in the past. A conservative approach would be to consider additional traffic generation additive to the current situation.

Based on this, no background traffic growth rate has been adopted for this assessment as this would be contrary to the historical trend.

STFM

The trip demands in the STFM assigns traffic such that all traffic is forced through the network along applicable routes, regardless of whether such an uplift in traffic would create unrealistic delays along routes such as Carlingford Road and Epping Road. Traffic models do have problems in forecasting flows under high levels of congestion.

From personal experience in the use of the STFM and its previous incarnates in modelling the Sydney Motorway Network (and more recently the WestConnex Project), exogenous adjustments need to be made across major traffic movement Screenline to balance demand with available capacity. The Screenline across M2, Epping Road, Victoria Road, and M4 is one such anomaly in the STFM.

While the STFM is typically relied on to provide an understanding on potential uplift in traffic volumes in non congested networks, noting commentary provided throughout this section, application of the outputs would create an unrealistic scenario particularly given there's been no growth along Carlingford Road.

I trust this is satisfactory; should you have any questions, please do not hesitate to contact me directly.

Yours sincerely

Stantec Australia Pty Ltd

Chris Wilson
Senior Principal Transport Advisory

Encl

Appendix A – Transport for NSW Response

Appendix B. Retail Traffic Generation Rate Review

As detailed in Appendix A, Transport for NSW have requested the development adopts traffic generation rates based on rates detailed in the Small Suburban Shopping Centres Analysis report ("Analysis Report") prepared by Bitzios on behalf of Transport for NSW dated 7 November 2018. For reference, the site data summary sheet provided in page 73 of the Analysis Report has been extracted in Figure 10.1.This contains key details from the Analysis Report including sites selected, size, surrounding land uses, vehicle trips and traffic generation rates during various peak hours.

Figure 10.1 – Site Data Summary Sheet -

Site No.	Site 11	Site 12	Site 13	Site 14	Site 15	Site 16	Site 17	Site 18	Site 19	Site 20
Centre Name	Casula	Aldi Wyoming	Northlakes	Lakeside	Aldi Fletcher	Fletcher Village	Lighthouse Plaza	Vincentia	Aldi Albion Park	IGA Woonona
Area	Sydney	Central Coast	Central Coast	Central Coast	Newcastle	Newcastle	Regional NSW	Regional NSW	Wollongong	Wollongong
Location	607 Hume Hwy, Casula NSW 2170	489 Pacific Highway, Wyoming NSW 2250	17-21 Old Pacific Highway, Charmhaven NSW 2263	Cnr The Entrance Road & Dening Street, The Entrance NSW 2261	Britannia Blvd & Minmi Road, Fletcher NSW 2287	Cnr Minmi Road & Churnwood Drive, Fletcher NSW 2287	100 Ocean Drive, Port Macquarie NSW 2444	8 Moona Creek Road, Vincentia NSW 2540	10 Ash Ave, Albion Park Rail NSW 2527	4-10 Russell St, Woonona NSW 2517
Dates of survey	7th-9th June	3rd-6th May	3rd-5th May	3rd-5th May	9th-13th May	10th-12th May	5th-7th April	5th-7th April	3rd-4th/26th-27th May	24th-26th May
Duration of surveys	3	4	3	3	4	3	3	3	4	3
Area Characteristics:										
Surrounding land use	Low density residential, near arterial road and school	Medium density residential, on arterial road	Low density residential, on arterial road	Low density residential, near beach	Low density residential, near Flecther Village	Low density residential, near Aldi Fletcher	Low density residential	Low density residential	Low density residential, near train station and sports fields	Low density residential
Nearby on-street parking regime	NO	YES - Restricted	YES - Restricted	YES - Restricted	NO	YES - Restricted	YES - Restricted	YES - Restricted	YES - Restricted	YES - Restricted
Principal adjacent road - AM Peak Period (weekday)										
Wednesday / Thursday	08:30 AM - 09:30 AM	08:30 AM - 09:30 AM	10:45 AM - 11:45 AM	11:15 AM - 12:15 PM	08:30 AM - 09:30 AM	08:30 AM - 09:30 AM	08:30 AM - 09:30 AM	11:45 AM - 12:45 PM	08:30 AM - 09:30 AM	08:30 AM - 09:30 AM
Friday	11:45 AM - 12:45 PM	08:30 AM - 09:30 AM	11:15 AM - 12:15 PM	11:00 AM - 12:00 PM	08:30 AM - 09:30 AM	08:30 AM - 09:30 AM	08:30 AM - 09:30 AM	11:45 AM - 12:45 PM	08:30 AM - 09:30 AM	08:30 AM - 09:30 AM
Principal adjacent road - PM Peak Period (weekday)										
Wednesday / Thursday	04:00 PM - 05:00 PM	04:15 PM - 05:15 PM	04:30 PM - 05:30 PM	02:45 PM - 03:45 PM	04:45 PM - 05:45 PM	04:45 PM - 05:45 PM	03:15 PM - 04:15 PM	04:15 PM - 05:15 PM	04:30 PM - 05:30 PM	03:15 PM - 04:15 PM
Friday	03:30 PM - 04:30 PM	04:30 PM - 05:30 PM	03:00 PM - 04:00 PM	01:45 PM - 02:45 PM	04:45 PM - 05:45 PM	04:30 PM - 05:30 PM	12:00 PM - 01:00 PM	03:15 PM - 04:15 PM	03:00 PM - 04:00 PM	04:30 PM - 05:30 PM
Principal adjacent road - Daily Peak (weekend)										
Saturday	02:45 PM - 03:45 PM	11:30 AM - 12:30 PM	11:00 AM - 12:00 PM	11:45 AM - 12:45 PM	10:45 AM - 11:45 AM	10:45 AM - 11:45 AM	10:00 AM - 11:00 AM	12:30 PM - 01:30 PM	02:15 PM - 03:15 PM	09:00 AM - 10:00 AM
Sunday	03:45 PM - 04:45 PM	12:45 PM - 01:45 PM			11:30 AM - 12:30 PM				02:15 PM - 03:15 PM	
Building Characteristics:										
Year built	0	0	2008	1979	2014	2013	1997	2015	0	Pre 2007
Major Tenant	Woolworths	Aldi	Coles	coles	ALDI	Coles	coles	Woolworths	ALDI	IGA
Gross Leasable Floor Area (GLFA) (m2)	4027	991	4831	5028	991	4933	5000	9505	1411	660
Major Tenant GLFA (m2)	3847	991	3500	3084	991	3633	3013	5743	1199	660
Specialty Store GLFA (m2) (other tenants)	180	0	1331	1944	0	1300	1987	3762	212	0
Vehicle Trips:										
Peak 1-hour vehicle-trips										
Wednesday / Thursday AM Peak	353	189	445	311	100	451	296	740	233	162
Friday AM Peak	376	178	476	324	98	489	385	775	259	205
Wednesday / Thursday PM Peak	510	234	565	293	150	739	459	711	309	208
Friday PM Peak	600	242	594	329	161	811	490	744	350	198
Saturday	588	278	564	289	160	750	480	809	344	181
Sunday	579	281			149				360	
Peak time of 1-hour vehicle-trips										
Wednesday / Thursday AM Peak	12:00:00 PM	10:30:00 AM	11:45:00 AM	10:30:00 AM	10:30:00 AM	10:45:00 AM	11:30:00 AM	9:45:00 AM	11:15:00 AM	10:00:00 AM
Friday AM Peak	11:15:00 AM	12:00:00 PM	10:45:00 AM	9:45:00 AM	12:00:00 PM	11:30:00 AM	11:00:00 AM	11:00:00 AM	11:00:00 AM	10:00:00 AM
Wednesday / Thursday PM Peak	5:45:00 PM	1:15:00 PM	4:15:00 PM	12:30:00 PM	3:30:00 PM	4:30:00 PM	5:00:00 PM	12:00:00 PM	4:45:00 PM	4:00:00 PM
Friday PM Peak	5:00:00 PM	4:15:00 PM	3:30:00 PM	3:00:00 PM	4:30:00 PM	4:45:00 PM	4:15:00 PM	12:15:00 PM	4:45:00 PM	3:45:00 PM
Saturday	2:00:00 PM	3:30:00 PM	11:00:00 AM	11:30:00 AM	11:30:00 AM	11:15:00 AM	10:30:00 AM	9:15:00 AM	11:15:00 AM	12:15:00 PM
Sunday	11:45:00 AM	2:00:00 PM			11:45:00 AM				11:15:00 AM	
Peak vehicle-trips per 100m2 GLFA										
Wednesday / Thursday AM Peak	8.77	19.07	9.21	6.19	10.09	9.14	5.92	7.79	16.51	19.06
Friday AM Peak	9.34	17.96	9.85	6.44	9.89	9.91	7.70	8.15	18.36	24.12
Wednesday / Thursday PM Peak	12.66	23.61	11.70	5.83	15.14	14.98	9.18	7.48	21.90	24.47
Friday PM Peak	14.90	24.42	12.30	6.54	16.25	16.44	9.80	7.83	24.81	23.29
Saturday	14.60	28.05	11.67	5.75	16.15	15.20	9.60	8.51	24.38	21.29
Sunday	14.38	28.36			15.04				25.51	
Peak vehicle-trips per parking space										
Wednesday / Thursday AM Peak	2.04	2.12	1.97	1.57	1.37	2.08	2.26	1.50	2.51	0.93
Friday AM Peak	2.17	2.00	2.11	1.64	1.34	2.25	2.94	1.57	2.78	1.18
Wednesday / Thursday PM Peak	2.95	2.63	2.50	1.48	2.05	3.41	3.50	1.44	3.32	1.20
Friday PM Peak	3.47	2.72	2.63	1.66	2.21	3.74	3.74	1.51	3.76	1.14
Saturday Peak	3.40	3.12	2.50	1.46	2.19	3.46	3.66	1.64	3.70	1.04
Sunday Peak	3.35	3.16			2.04				3.87	
Total daily vehicle trips										
Wednesday / Thursday	4786	1873	5045	2844	1076	5332	3633	7202	2409	1605
Friday	3978	1685	4369	2906	985	4607	3580	6626	2482	1557
Saturday	4224	1776	4006	2288	1149	5194	3762	6313	2461	1231
Sunday	4004	1701			997				2607	
Total daily vehicle-trips per 100m2 GLFA										
Wednesday / Thursday	118.85	189.00	104.43	56.56	108.58	108.09	72.66	75.77	170.73	188.82
Friday	98.78	170.03	90.44	57.80	99.39	93.39	71.60	69.71	175.90	183.18
Saturday	104.89	179.21	82.92	45.51	115.94	105.29	75.24	66.42	174.42	144.82
Sunday	99.43	171.64			100.61				184.76	
Total daily vehicle-trips per parking space										
Wednesday / Thursday	27.66	21.04	22.32	14.36	14.74	24.57	27.73	14.61	25.90	9.22
Friday	22.99	18.93	19.33	14.68	13.49	21.23	27.33	13.44	26.69	8.95
Saturday	24.42	19.96	17.73	11.56	15.74	23.94	28.72	12.81	26.46	7.07
Sunday	23.14	19.11			13.66				28.03	
Vehicle-trips during adjacent road AM weekday peak										
Wednesday / Thursday	295	119	368	316	98	370	213	708	172	113
Friday	364	99	450	410	71	NA	279	750	153	108
Vehicle-trips during adjacent road PM weekday peak										
Wednesday / Thursday	295	119	368	316	98	370	213	708	172	113
Friday	534	225	535	392	NA	769	314	726	303	138
Vehicle-trips during adjacent road weekend peak										
Saturday	556	220	564	356	140	717	448	698	298	133
Sunday	440	197			138				340	

Source: Page 73, Small Suburban Shopping Centres Analysis report, prepared by Bitzios on behalf of Transport for NSW, 7 November 2018

A review around the suitability of using these rates is provided below.

Suitability of Surveyed Sites

A key criteria for the selection of sites surveyed as part of the Small Suburban Shopping Centres Analysis was the ease in isolating the site from other developments (other businesses outside the shopping centre). Bitzios notes in the Analysis Report that this was one of the key challenges and describes their interpretation of this selection criteria as identifying sites that were isolated from nearby commercial development.

As a result, majority of the sites are set in a different transport and land use environment when compared to the development site in Epping Town Centre. This includes:

- majority of the developments were located proximate to low density residential land uses
- majority of developments were located with limited or restricted co-location of other retail / commercial developments
- majority of developments had significantly less public transport accessibility than Epping Town Centre is afforded, and therefore benefits less from pedestrian traffic.

As such, the travel characteristics of visitors to the selected shopping centres are generally not comparable to characteristics expected in Epping Town Centre, given the increased public transport availability, co-location with a range of retail, commercial and educational land uses, as well as proximity to high density residential development resulting in the retail uses generally being less reliant on customers driving to and from site.

Key sites that could be considered the most similar to Epping Town Centre include Cantebury (site 5), Manly Vale (site 10), Wentworthville (site 7) and Greenacre (site 8), however both Cantebury and Manly Vale are less than 1,500 square metres GLFA and as such, are not relevant noting the Analysis Report acknowledges sites less than 2,000 square metres GLFA have different traffic generation profiles to those greater than 2,000 square metres GLFA. Both Wentworthville and Greenacre recorded traffic generation rates are 20 to 30 per cent lower than the average of all sites greater than 2,000 square metres GLFA, although these sites are still not considered to be comparable to travel characteristics within Epping Town Centre.

Suitability of Traffic Generation Rates – Peak Period Review

It is also noted that the traffic generation rates have been derived based on the site peak hour rather than the surrounding road network peak hour. Section 4.3.1 of the Analysis Report notes *"compared to the frontage road peak periods, the site peak periods were typically 1-2 hours later"*. Section 7.1 of the Analysis Report also states *"Shopping Centre site peak hours typically differ from road network peak hours and accordingly the site peak hours have been used for determination of "design" trip generation rates"*.

Section 3.2.2 of the Guide to Traffic Generating Developments (Transport for NSW, 2002) states the following:

"Two periods of traffic generation need to be considered:

- *the peak activity time of the development itself.*
- *the peak activity time of the adjacent road network.*

The first of these is generally used as a basis for reviewing access to the site and driveway design requirements. The second and possibly more important period is used to assess the effect of the development on the road system. Such an assessment should identify whether any road improvements or traffic management measures are required to accommodate the increased traffic on the system."

For the purpose of understanding the traffic impact of the development on the external road network, it would therefore not be appropriate to adopt traffic generation rates based on the site peak hour rather than the road network peak hour.

With this in mind, Stantec have reviewed the site data summary sheet extracted in Figure 10.1. This sheet details the traffic generated by each site both during the site peak hours, as well as the road network peak hours, and hence could be used to understand the sites traffic generation rates based on the road network peak period. Notwithstanding, the vehicle trips during adjacent road AM and PM weekday peak hours are equivalent and hence it is expected that the data sheet has an error and the data cannot be used for this purpose.

Suitability of Traffic Generation Rates – Comparison to Existing Site

A further review of the traffic generation rates provided in Analysis Report and comparison to traffic generated by the existing site is provided below.

Section 4.3.1 of the Analysis Report suggests a traffic generation rate of 7.76 and 10.41 tripes per 100 square metres GLFA is applicable to sites with greater than 2,000 square metres GLFA. Section 10 of the report also provides recommended trip generation rates as reproduced in Figure 10.2. Both rates are based on the site peak hours, rather than the road network peak hours.

Figure 10.2 – Smaller Suburban Shopping Centres Trip Generation Recommendations

Day	Period	Recommended Models		
		0 – 1,000m square GLFA	1,000 – 6,000m square GLFA	6,000 – 10,000m square GLFA
Vehicle Trips				
Wednesday /Thursday	AM Peak	0.192*A	0.066*A + 126	0.076*MT + 0.075*OT
	PM Peak	0.259*A	0.089*A + 170	0.216*A – 591
	Daily	2.022*A	0.695*A + 1327	1.684*A – 4608

Source: Table 10.1, Small Suburban Shopping Centres Analysis report, prepared by Bitzios on behalf of Transport for NSW, 7 November 2018

The indicative development scheme proposes to provide around 5,736 square metres retail GLFA comprising 3,392 and 2,344 square metres supermarket and specialty retail GLFA. Application of the rates outlined in Section 4.3.1 of the report results in the development generating 445 and 597 vehicle trips in the AM and PM peak hours, respectively. Application of the rates outlined in Section 10 results in the development generating 505 and 680 vehicle movements in the AM and PM peak hours, respectively. Assuming 20 per cent trip containment for retail uses as agreed with Transport for NSW, traffic generation ranges from 356 to 400 and 478 to 544 trips respectively in the AM and PM peak hours.

On Thursday, 11 November 2022, Stantec commissioned traffic movement counts at the following locations along Rawson Street:

- Commercial building car park entry/ exit driveway
- Coles entry and exit driveways
- Rawson Street Council car park entry and exit driveways.

The Coles car park site cannot be considered in isolation to gauge traffic generation rates for the supermarket given a proportion of customers currently park within the adjacent Council car park.

The Council car park is currently used for a range of trip purposes within the town centre, including providing short to medium term parking for visitors to retail / commercial developments, as well as acting as a popular parking area for vehicles picking up and dropping off passengers visiting the town centre or walking to the train, metro and bus interchange. Most notably, it is the primary car parking facility that services a multitude of specialty retail offerings along Rawson Street and Beecroft Road, including 991 square metres GLFA on the ground floor of the existing commercial office building on site, as well as servicing a proportion of parking demand for the existing Coles supermarket. While some on-street parking is available along Rawson Street to assist in these purposes, there are no other public car parks servicing retail offerings along Rawson Street and Beecroft Road, with exception of the Coles car park.

Currently the Council and Coles car park generate a total of around 170 and 509 vehicle movements in the AM and PM peak hours, with around 78 and 22 per cent of traffic generated by the Council and Coles car park respectively.

Clearly the indicative development scheme which effectively provides the equivalent supermarket offering to existing, as well as an uplift of around 1,400 square metres GLFA of specialty retail uses, will not generate traffic that exceeds the existing traffic generated by the site and adjacent Council car park. It is more appropriate to assume the site will generate traffic volumes lower than the existing Coles car park and adjacent Council car park.

Summary

Based on a review of the above, it is clear that traffic generation rates based on the Small Suburban Shopping Centres Analysis report are not suitable for Epping Town Centre.

The alternative traffic generation rates used in the assessment to date are summarised at Figure 10.3.

Figure 10.3 – Traffic generation rates agreed with Council

Land Use	AM Peak Traffic Rate	PM Peak Traffic Rate
Retail – supermarket	4.5 per 100m2 GLFA	13.5 per 100m2 GLFA
Retail – specialty	1.3 per 100m2 GLFA	4.0 per 100m2 GLFA

Application of these rates to the indicative development scheme results in the site generating 183 and 552 vehicle trips in each peak period. Assuming 20 per cent trip containment for retail uses as agreed with Transport for NSW, the site generates 146 and 441 vehicle trips in each peak period.

When benchmarking the site traffic generation against existing traffic generating characteristics for the Coles and Council car parks of 170 and 509 vehicle trips in each peak periods, it is clear the adopted traffic generation rates are appropriate.

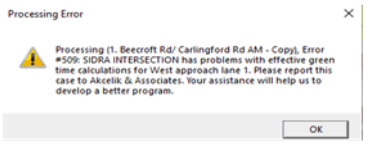
Appendix C. Detailed Calibration Notes

Model Calibration Notes

Site Information	Name	Epping/ Blaxland Road/ Langston Place	
	TCS Number	216	
	Peak Hour	AM (7:30am to 8:30am)	PM (4:15pm to 5:15pm)
Lane Geometry	Lane Utilisation	Nth Lane 1 = 75% (default 100%)	
	Geometry	Free Queue - West Slip Ln, Left = 6m, Thr = 6m	
	Capacity Adjustment		
	Basic Saturation Flow		
Lane Movements	Flow Proportions		
	Blockage Calibration		
Pedestrians	Pedestrian Minimum Time		
	Pedestrian Maximum Time		
	Pedestrian Actuation		
Volumes	Peak Flow Factor	West RT, Thr = 98%, West LT = 97%, South LT = 99%, East Thr - 99%	East Thr = 99%, West LT = 97%, Thr = 98%, RT = 98%
	Volume adjustment		
Priorities	Priorities		
Gap Acceptance	Opposing Peds (Signals)	West LT = 10 sec, North LT = 9 sec	West LT = 10 sec, North LT = 9 sec
	Minimum Departures		
Vehicle Movement Data	Queue Space		
	Signal Coordination	Phase D commences 39 seconds before start of Phase B at site 706	Phase A commences 19 seconds before start of Phase B at site 706
	Start Loss		
	End Loss		
	Minimum Green	West RT = 15 sec, East Through = 50 sec	East Thr = 63 sec
	Maximum Green		
	Phase Actuation		
	Late Start		
Phasing & Timing	Phase Sequence	A, B, C, D	A, B, C, D
	Reference Phase	D	A
	Variable Phase		
	Yellow Time	5 seconds, all phases	5 seconds, all phases
	All-Red Time	2 seconds, all phases	2 seconds, all phases
	Dummy Phases		
	Filter Option		
Intersection	Area Factor	West = 1.15	South = 0.76, west = 1.1
	Extra Bunching		

Model Calibration Notes

Site Information	Name	Beecroft/ Carlingford	
	TCS Number	706	
	Peak Hour	AM (7:30am to 8:30am)	PM (4:15pm to 5:15pm)
Lane Geometry	Lane Utilisation		
	Geometry	West Slip Ln Free Queue - 16m Thr, 25m Left	West Slip Ln Free Queue - 16m Thr, 25m Left
	Capacity Adjustment		
	Basic Saturation Flow		
Lane Movements	Flow Proportions	West RT, Lane 1 = 100% Lane 1. West RT, Lane 2 = 80% lane 2, 20% Lane 1	West RT, Lane 1 = 100% Lane 1. West RT, Lane 2 = 90% lane 2, 10% Lane 1
	Blockage Calibration		
Pedestrians	Pedestrian Minimum Time		
	Pedestrian Maximum Time		
	Pedestrian Actuation		
	Unsignalised Crossing	West approach slip lane, remove crossing as SIDRA error excerpted below with effective green time calculations for lane 1. Note only 7 pedestirans recorded in AM peak hour.	West approach slip lane, remove crossing as SIDRA error excerpted below with effective green time calculations for lane 1. Note only 7 pedestirans recorded in PM peak hour.
Volumes	Peak Flow Factor	Nth Thr - 96%, West RT - 99%, Sth LT = 99%, Sth Thr - 97%	Sth Thr - 96%, Nth Thr - 99%, Nth RT - 96%, West RT - 96%
	Volume adjustment		
Priorities	Priorities		
Gap Acceptance	Opposing Peds (Signals)		
	Minimum Departures		
Vehicle Movement Data	Queue Space		
	Signal Coordination	Phase B commences 39 seconds after start of phase D at site 216 Phase B commences 7 seconds after start of phase B at site 1015	Phase B commences 19 seconds after start of phase A at site 216 Phase B commences 7 seconds after start of phase B at site 1015
	Start Loss		
	End Loss		
	Minimum Green		West RT = 44 sec, Sth Thr = 49 sec
	Maximum Green		
	Phase Actuation		
	Late Start		
Phasing & Timing	Phase Sequence	A, C, B	A, C, B
	Reference Phase		
	Variable Phase		
	Yellow Time		
	All-Red Time		
	Dummy Phases		
	Filter Option		
Intersection	Area Factor	South = 1.05	South = 1.1, North = 1.2
	Extra Bunching		



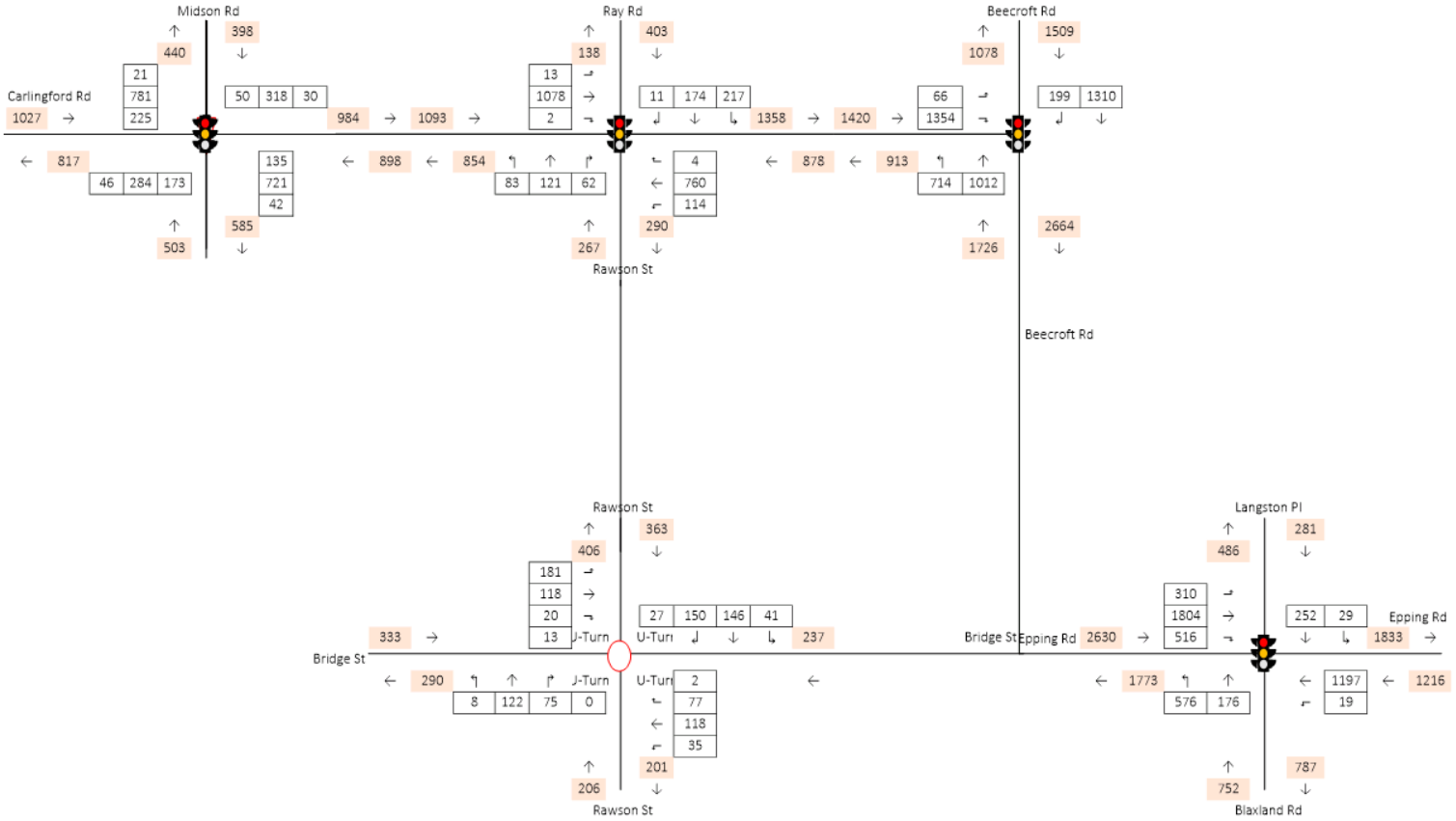
Model Calibration Notes

Site Information	Name	Carlingford/ Midson	
	TCS Number	1068	
	Peak Hour	AM (7:30am to 8:30am)	PM (4:15pm to 5:15pm)
Lane Geometry	Lane Utilisation	Sth Ln 1 - 50% (program assumes 20%) Nth Ln 1 - 50% (program assumes 25%)	Sth Ln 1 - 60% (program assumes 20%) Nth Ln 1 - 60% (program assumes 25%)
	Geometry		
	Capacity Adjustment		
Lane Movements	Flow Proportions	Sth RT - 40% lane 1, 60% lane 2	Sth RT - 40% lane 1, 60% lane 2
	Blockage Calibration		
Pedestrians	Pedestrian Minimum Time		
	Pedestrian Maximum Time		
	Pedestrian Actuation	50% (actual is 25%)	
Volumes	Peak Flow Factor		
	Volume adjustment		
Priorities	Priorities		
Gap Acceptance	Opposing Peds (Signals)		
	Minimum Departures		
Vehicle Movement Data	Queue Space		
	Signal Coordination	None, different subsystem and no link plans	None, different subsystem and no link plans
	Start Loss		
	End Loss		
	Minimum Green	Sth Thr = 27 sec	
	Maximum Green		
	Phase Actuation		
	Late Start		
Phasing & Timing	Phase Sequence	A, B, C, D, E, F, F1, F2	A, B, C, D, E, F, F1, F2
	Reference Phase	A	A
	Variable Phase	B, C, F1, F2	B, C, F1, F2
	Yellow Time	4	4
	All-Red Time	2	2
	Dummy Phases		
	Filter Option		
Intersection	Area Factor		
	Extra Bunching		

Model Calibration Notes

Site Information	Name	Carlingford/ Rawson/ Ray	
	TCS Number	1015	
	Peak Hour	AM (7:30am to 8:30am)	PM (4:15pm to 5:15pm)
Lane Geometry	Lane Utilisation		5th Lane 1 = 45% (SIDRA calculates 32%)
	Geometry		
	Capacity Adjustment		
Lane Movements	Flow Proportions		
	Blockage Calibration		
Pedestrians	Pedestrian Minimum Time		
	Pedestrian Maximum Time		
	Pedestrian Actuation		
Volumes	Peak Flow Factor	West Thr & LT - 98%, East Thr = 97%	West Thr - 97%
	Volume adjustment		
Priorities	Priorities		
Gap Acceptance	Opposing Peds (Signals)	5th & Nth Approach = 4 seconds for all movements including through. East & West LT = 4 seconds	5th & Nth Approach = 4 seconds for all movements including through. East & West LT = 4 seconds
	Minimum Departures		
Vehicle Movement Data	Queue Space		
	Signal Coordination	Phase B commences seven seconds before start of phase B at site 706	Phase B commences seven seconds before start of phase B at site 706
	Start Loss		
	End Loss		
	Minimum Green	West Thr = 75 sec	West Thr = 80 sec
	Maximum Green		
	Phase Actuation		
	Late Start		
Phasing & Timing	Phase Sequence	A, B	A, B
	Reference Phase		
	Variable Phase		
	Yellow Time		
	All-Red Time		
	Dummy Phases		
	Filter Option		
Intersection	Area Factor	West = 1.2, South = 1.1	
	Extra Bunching		

Appendix D. Turning Movement Diagrams



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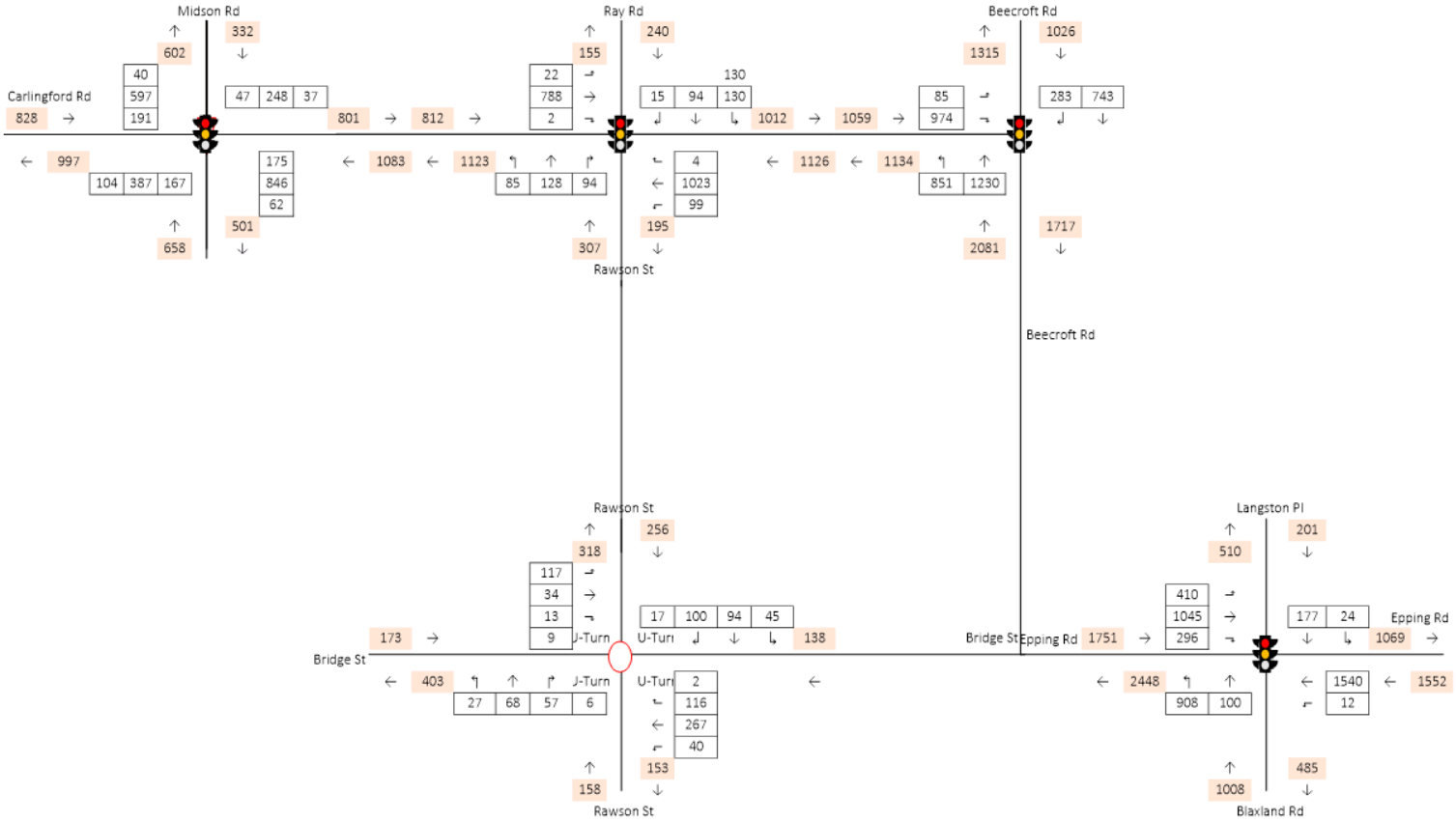

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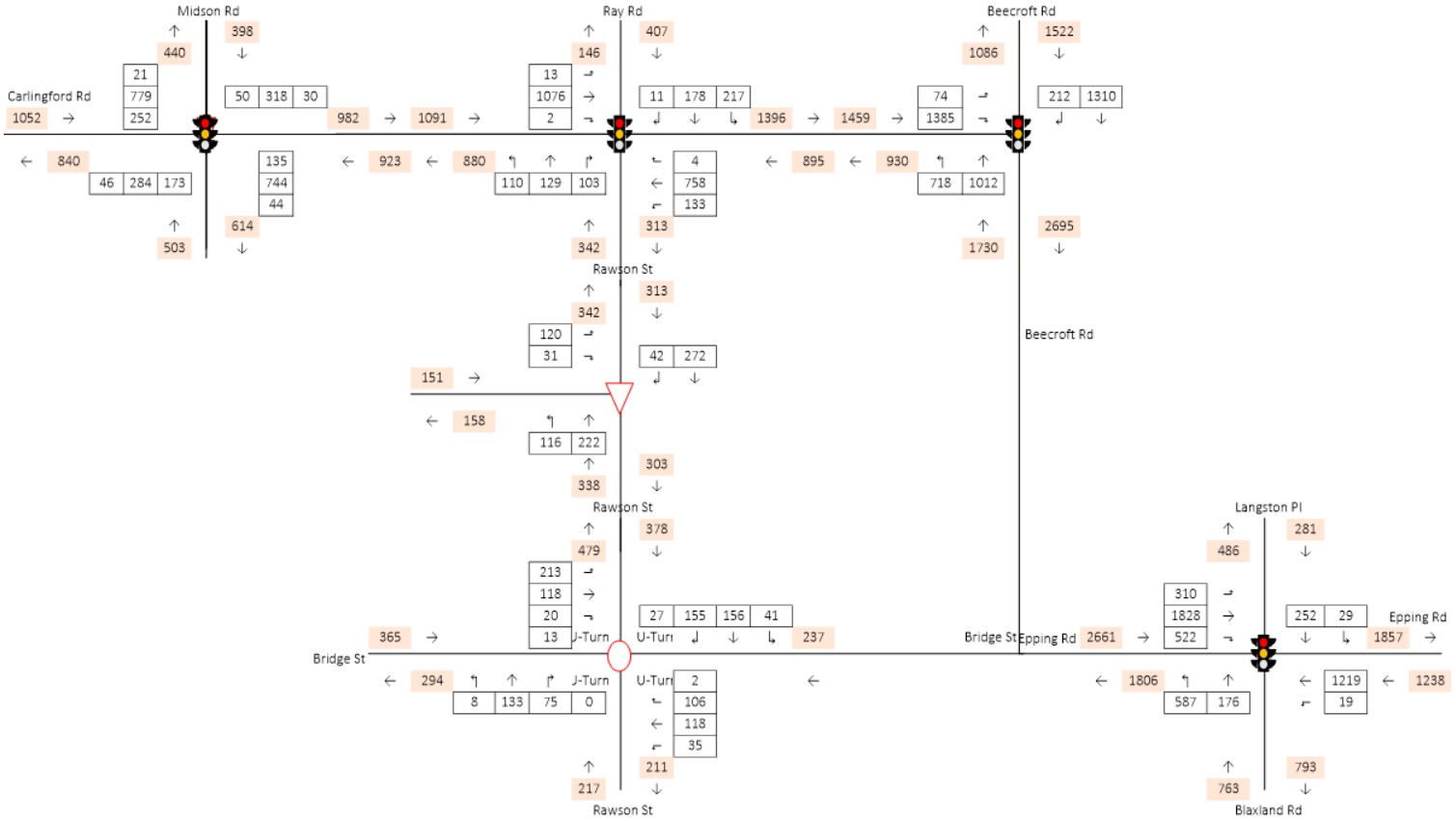
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Beecroft Rd
Carlingford Rd
Rawson St
Beecroft Rd
Rawson St
Langston Pl
Bridge St
Epping Rd
Bridge St
Epping Rd
Rawson St
Blaxland Rd
U-Turn
U-Turn
U-Turn

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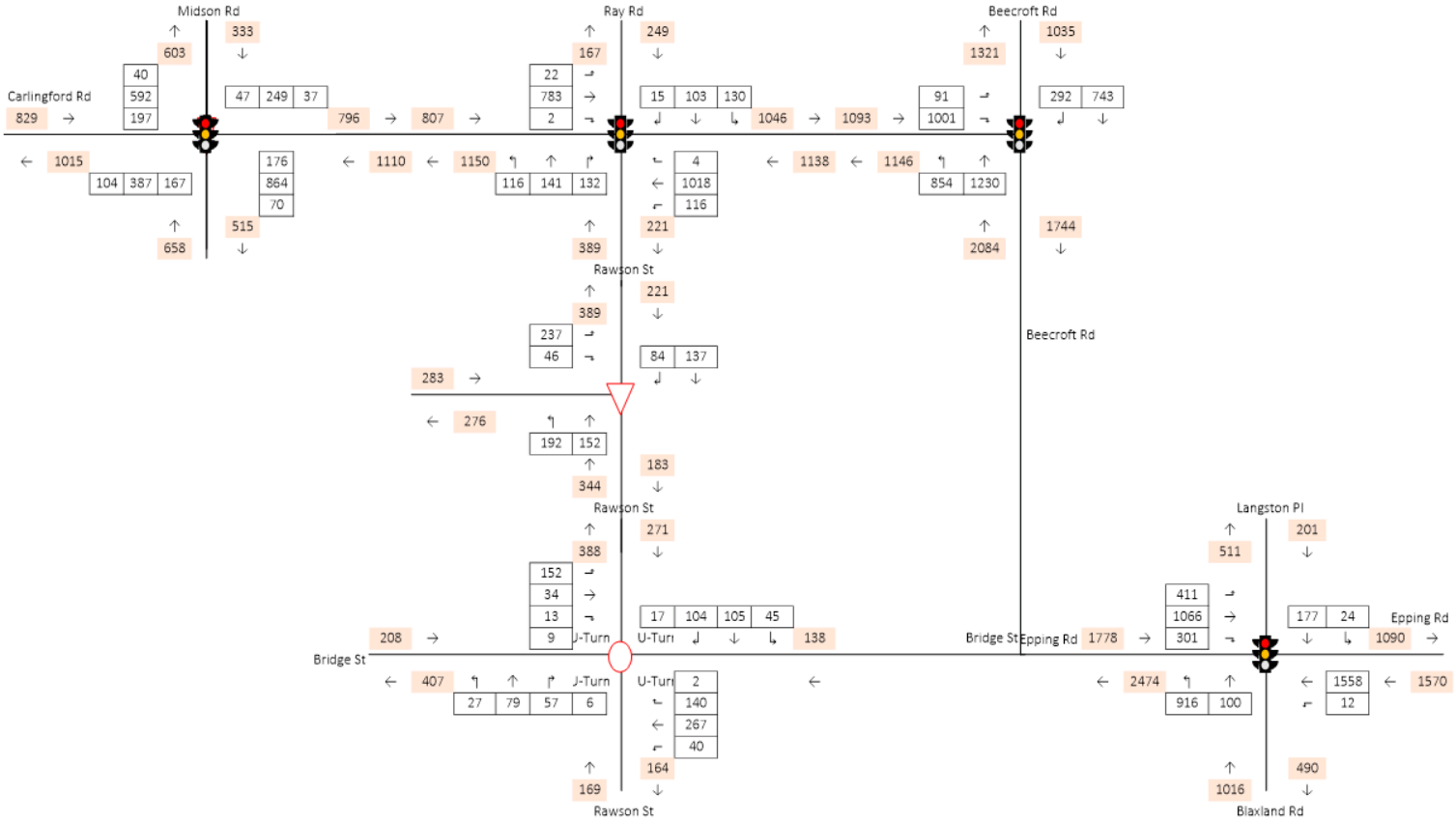
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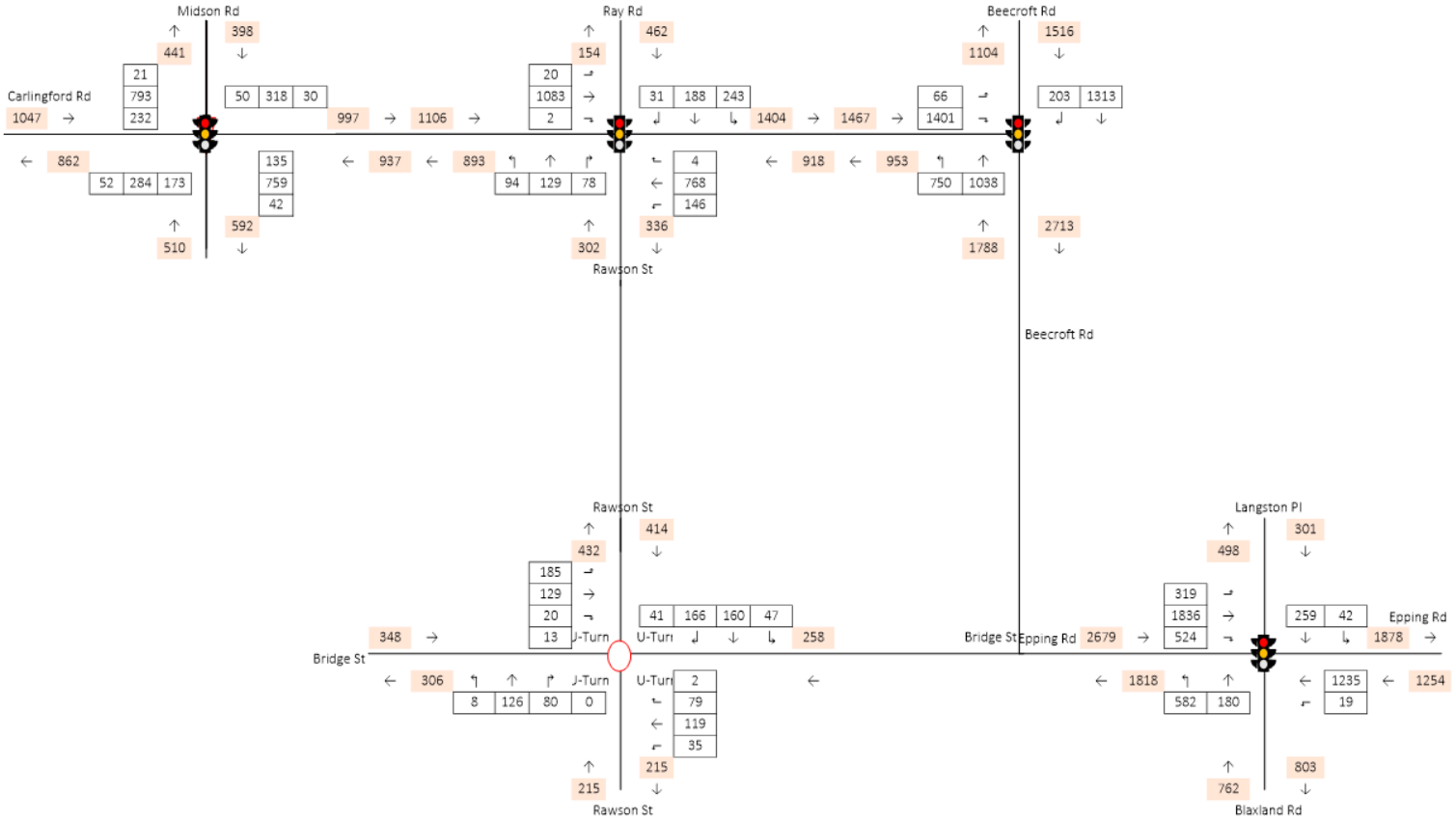
Bridge St
Rawson St
Blaxland Rd

Sc 2 n M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Bridge St
Epping Rd
Bridge St
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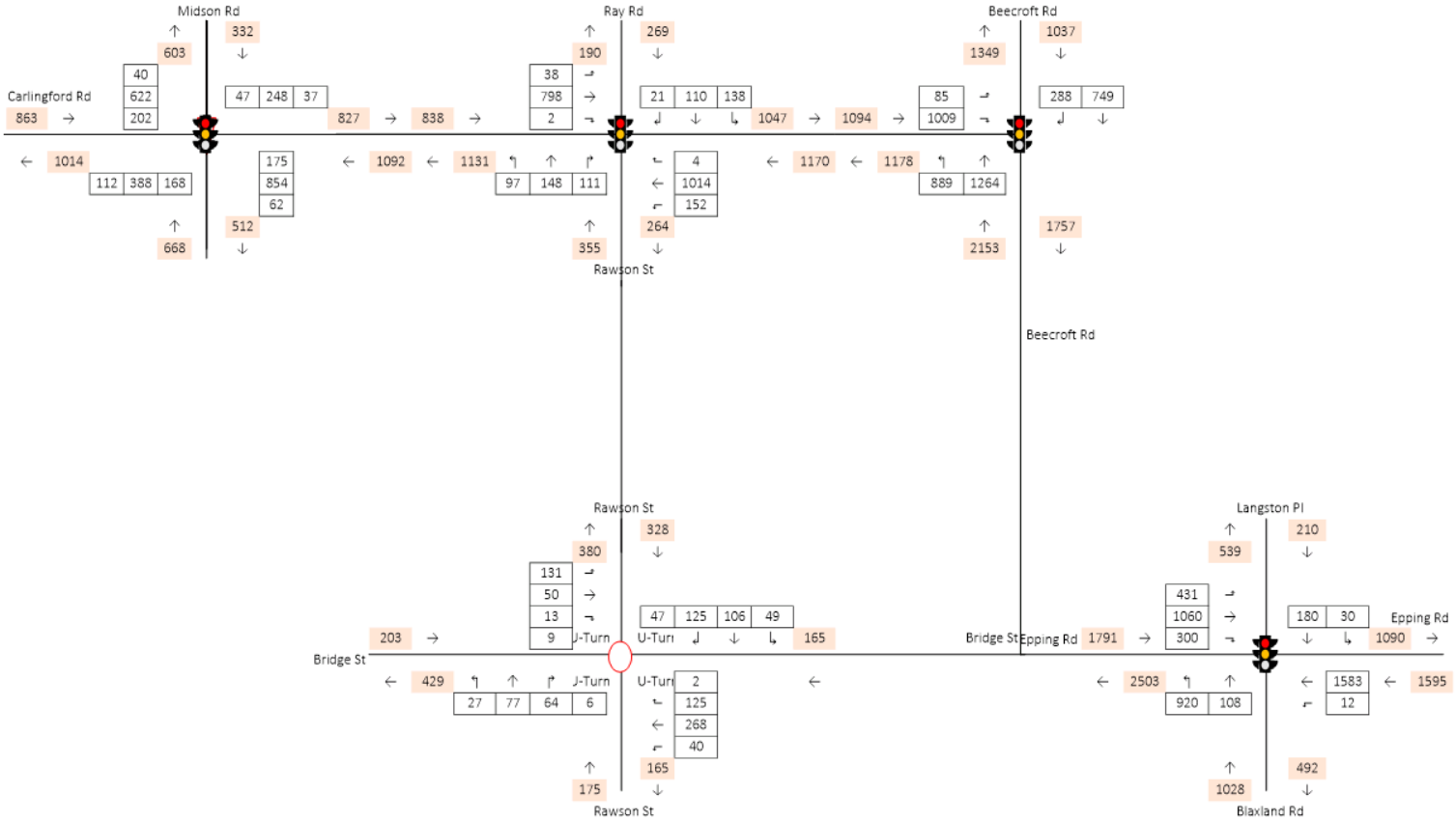
Rawson St
Blaxland Rd

Sc 3 n AM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Bridge St
Epping Rd
Bridge St
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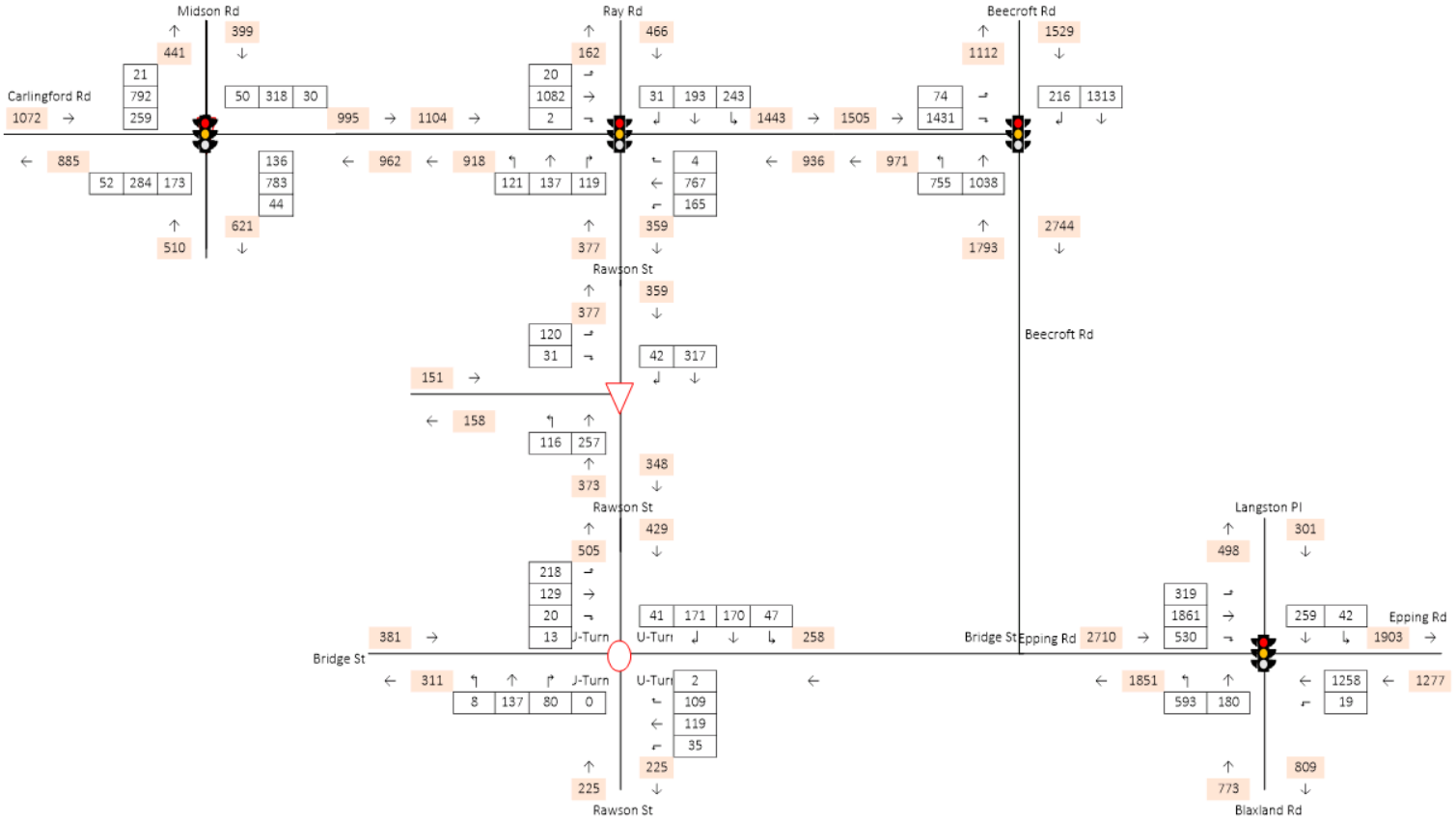
Blaxland Rd

Sc 3 n M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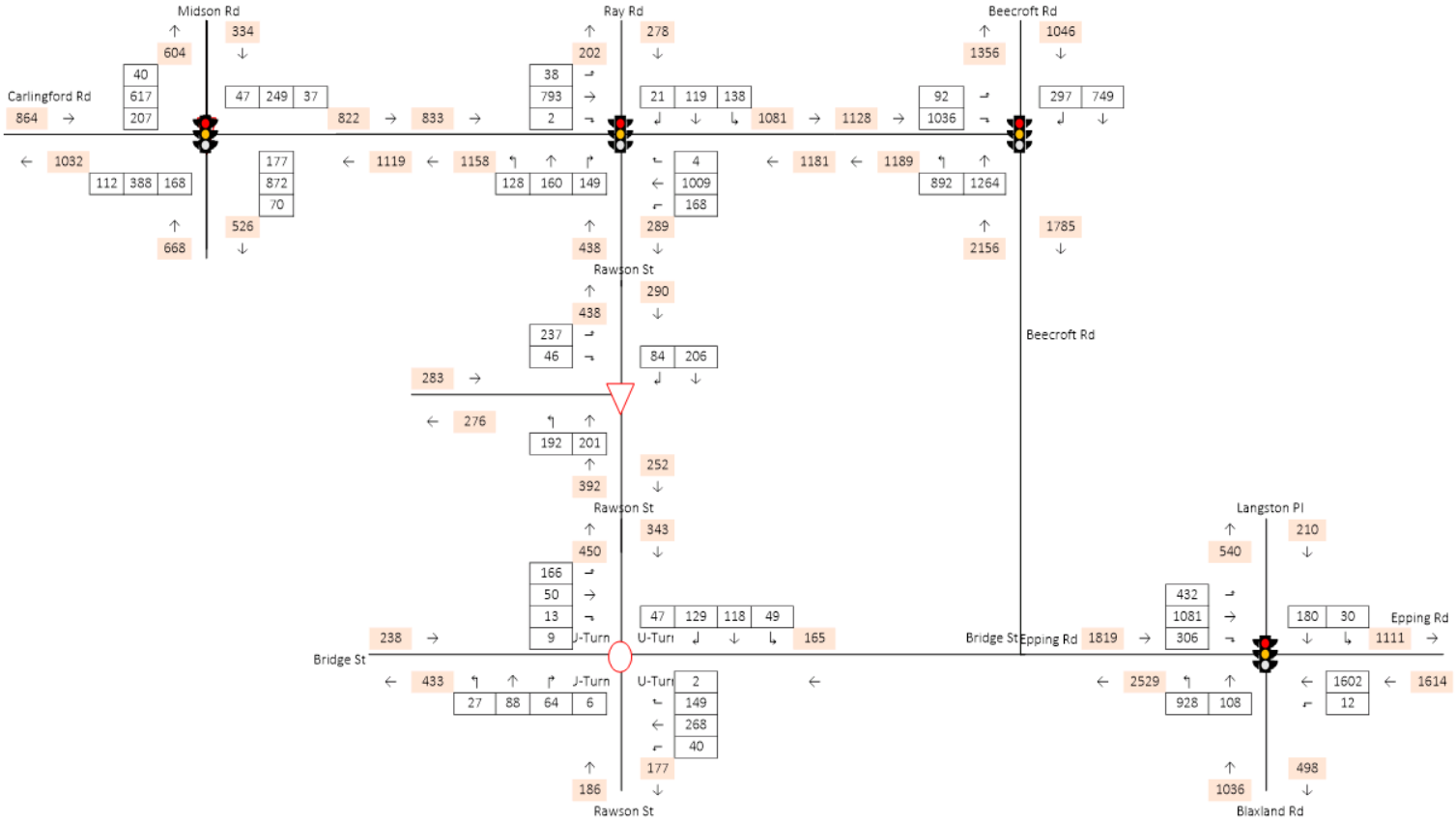
U-Turn
U-Turn

Sc AM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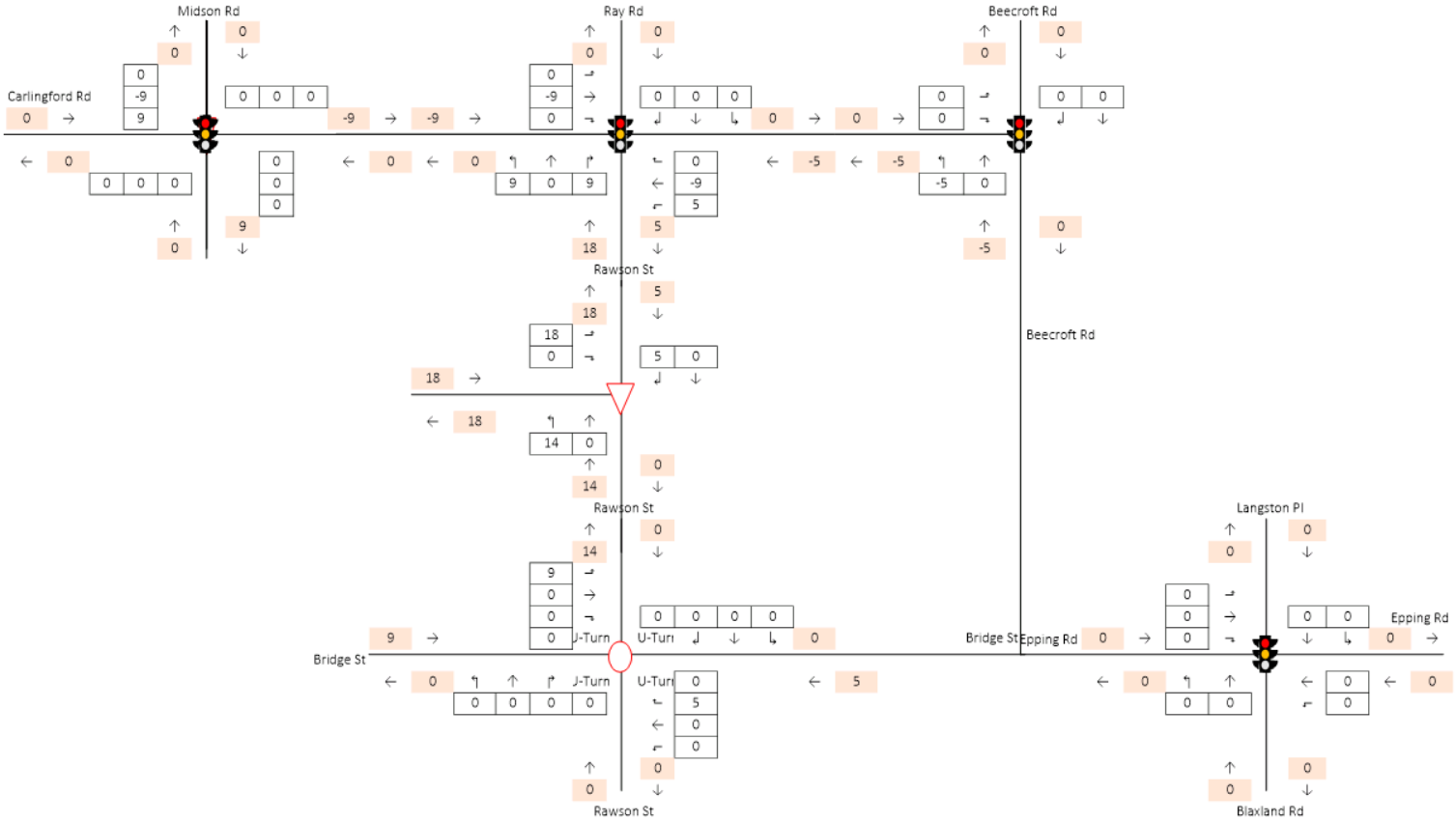
Sc M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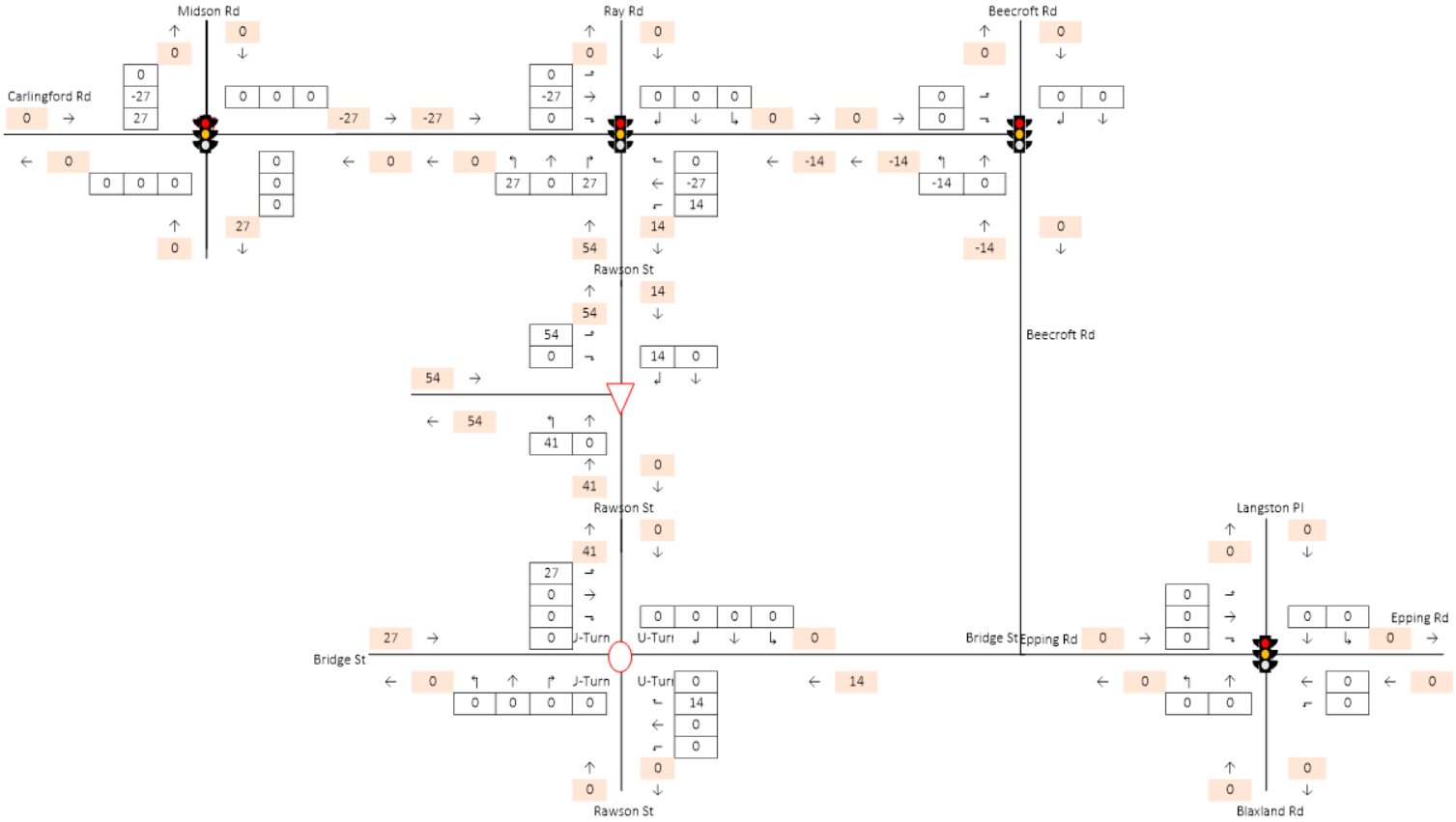
Blaxland Rd

t i ss r i s AM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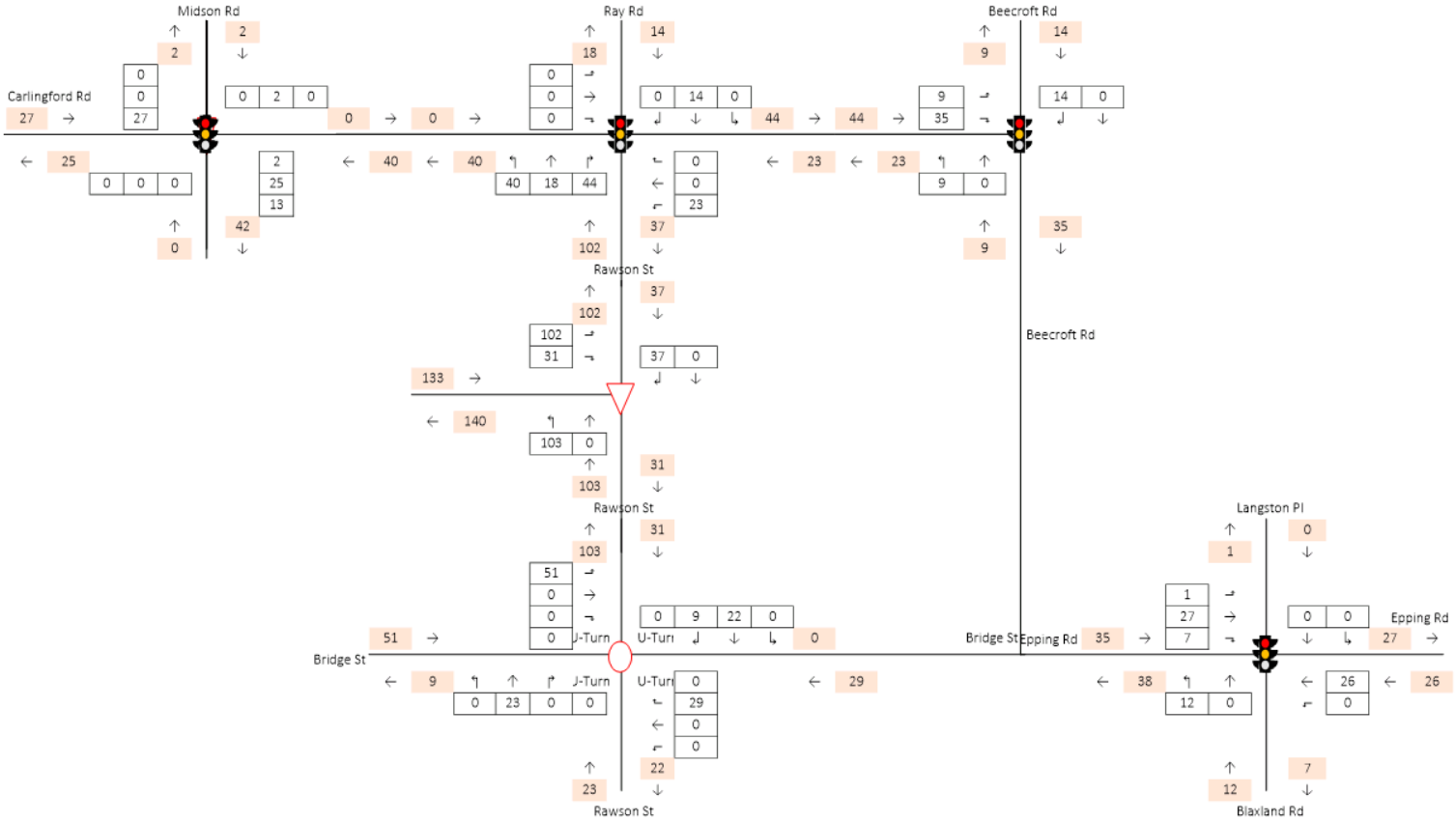
Blaxland Rd

t i ss r i s M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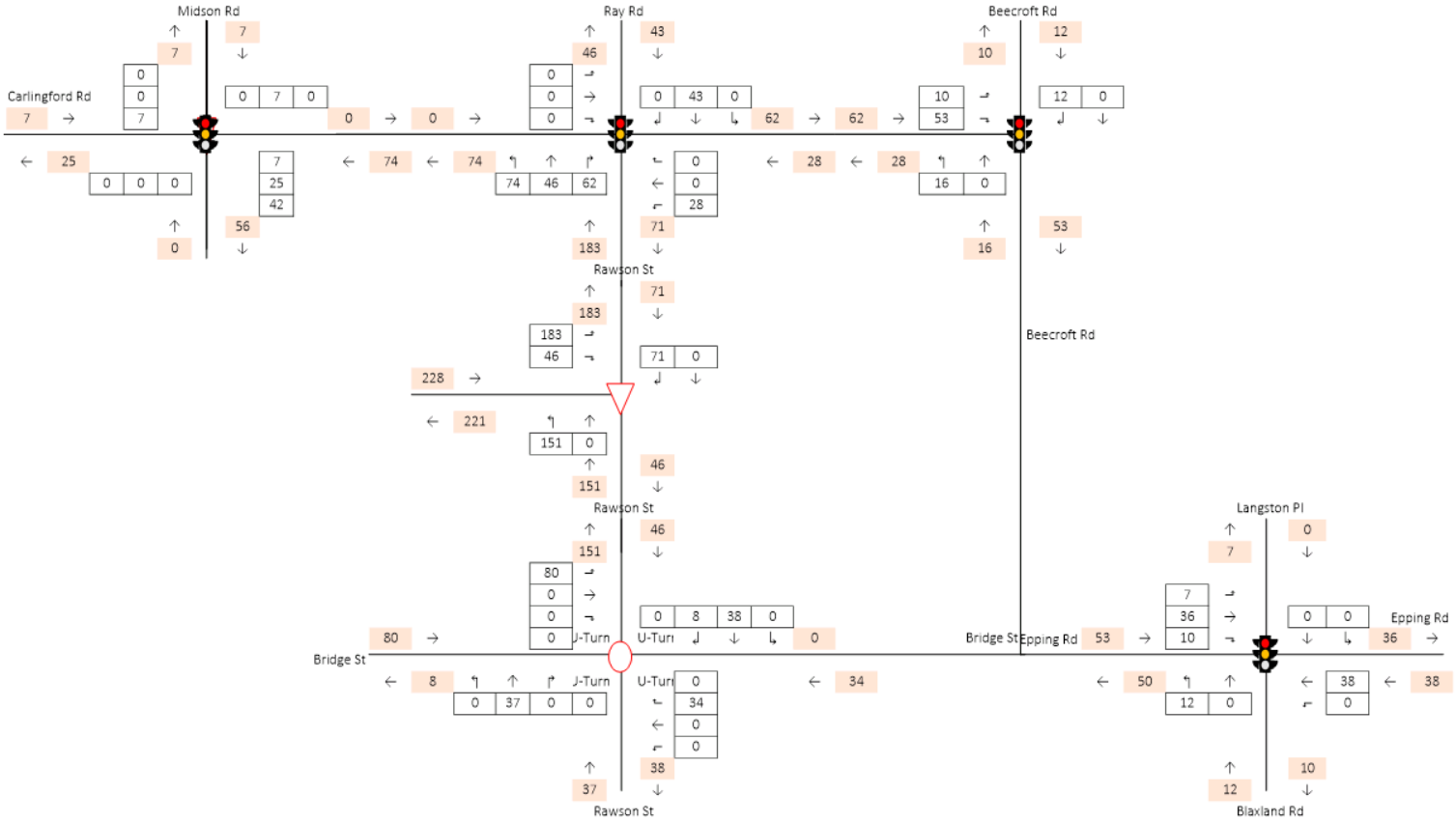
Rawson St
Blaxland Rd

A s s r i s AM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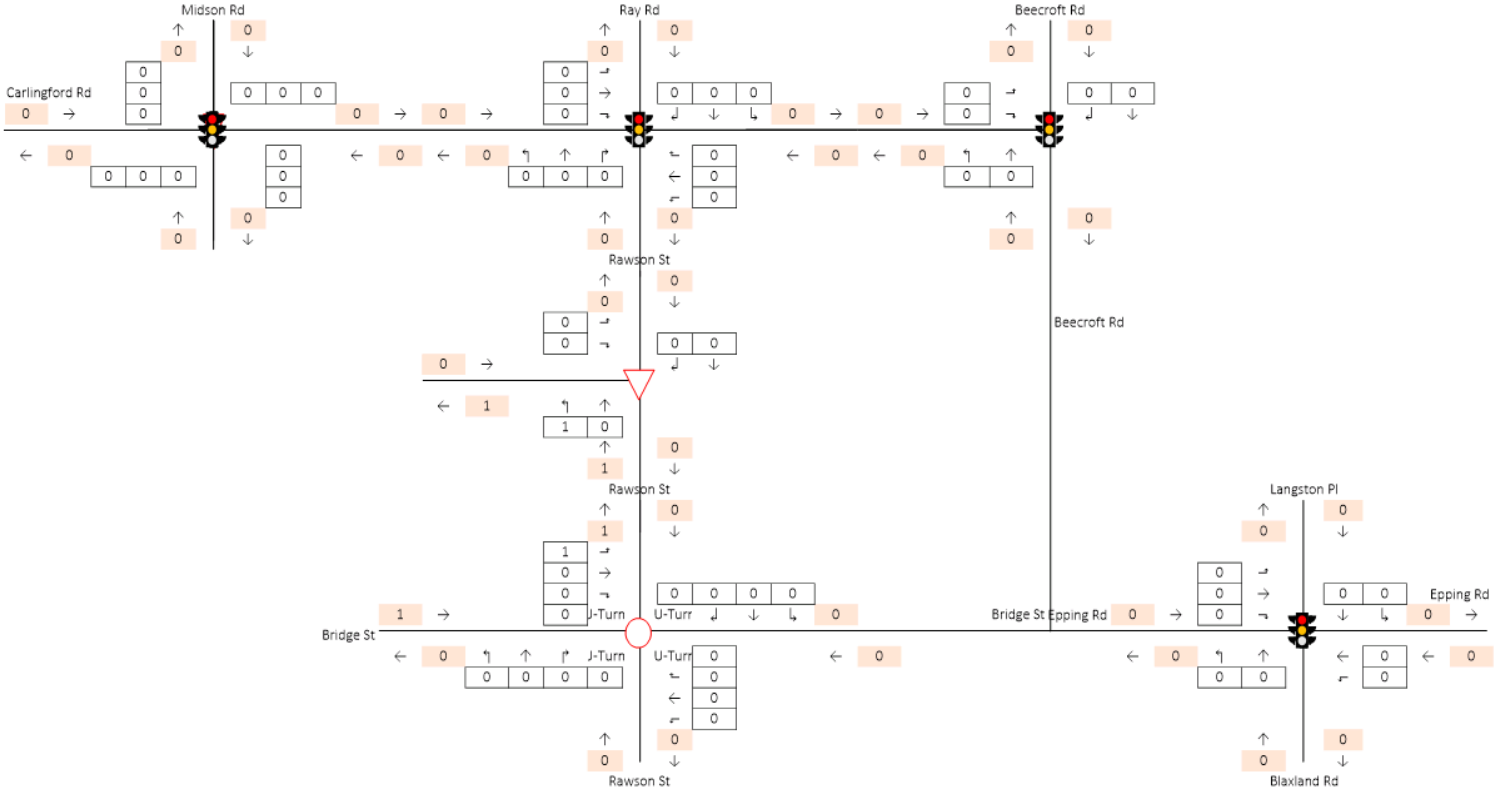
A s s r i s M



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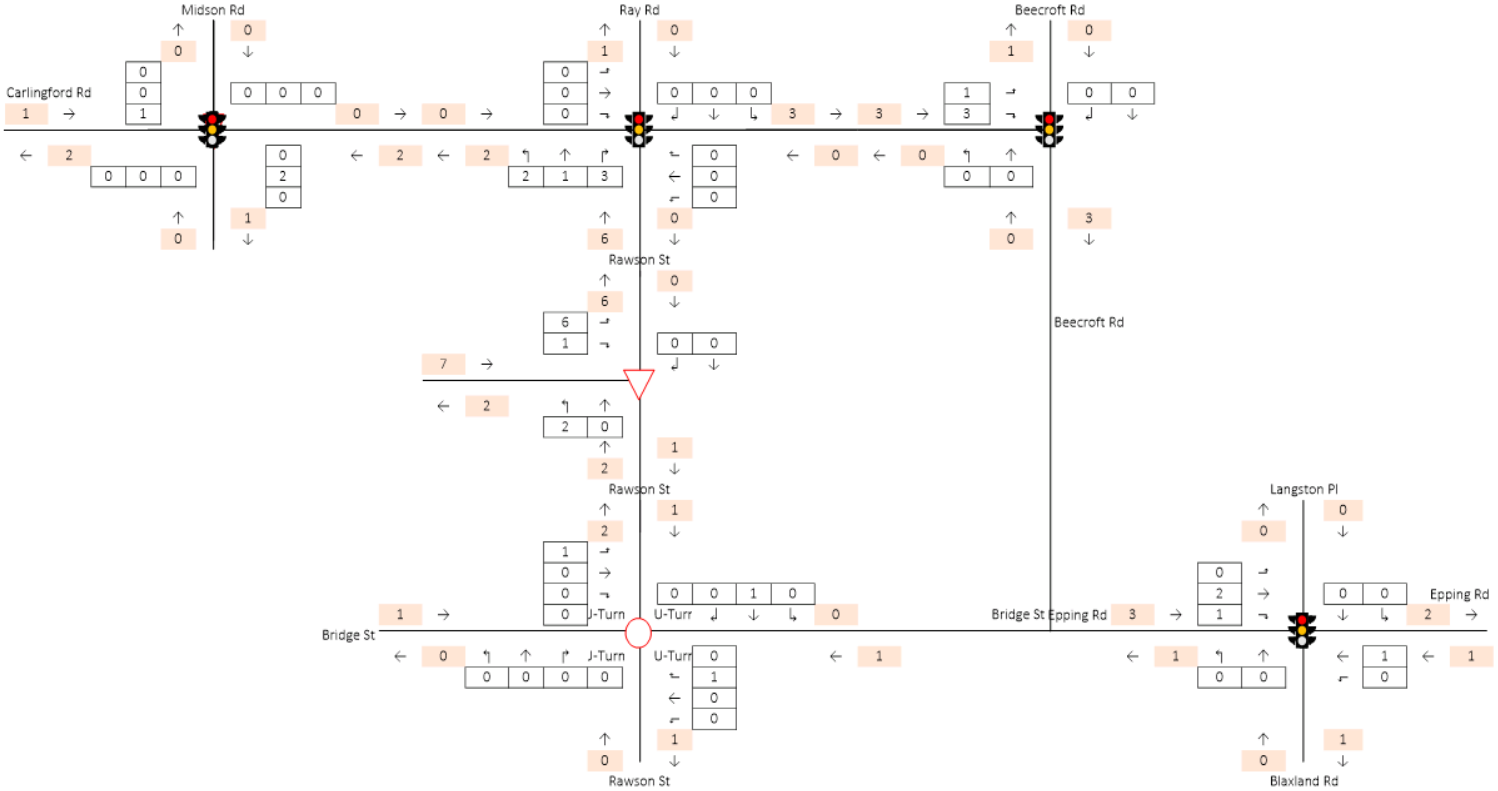
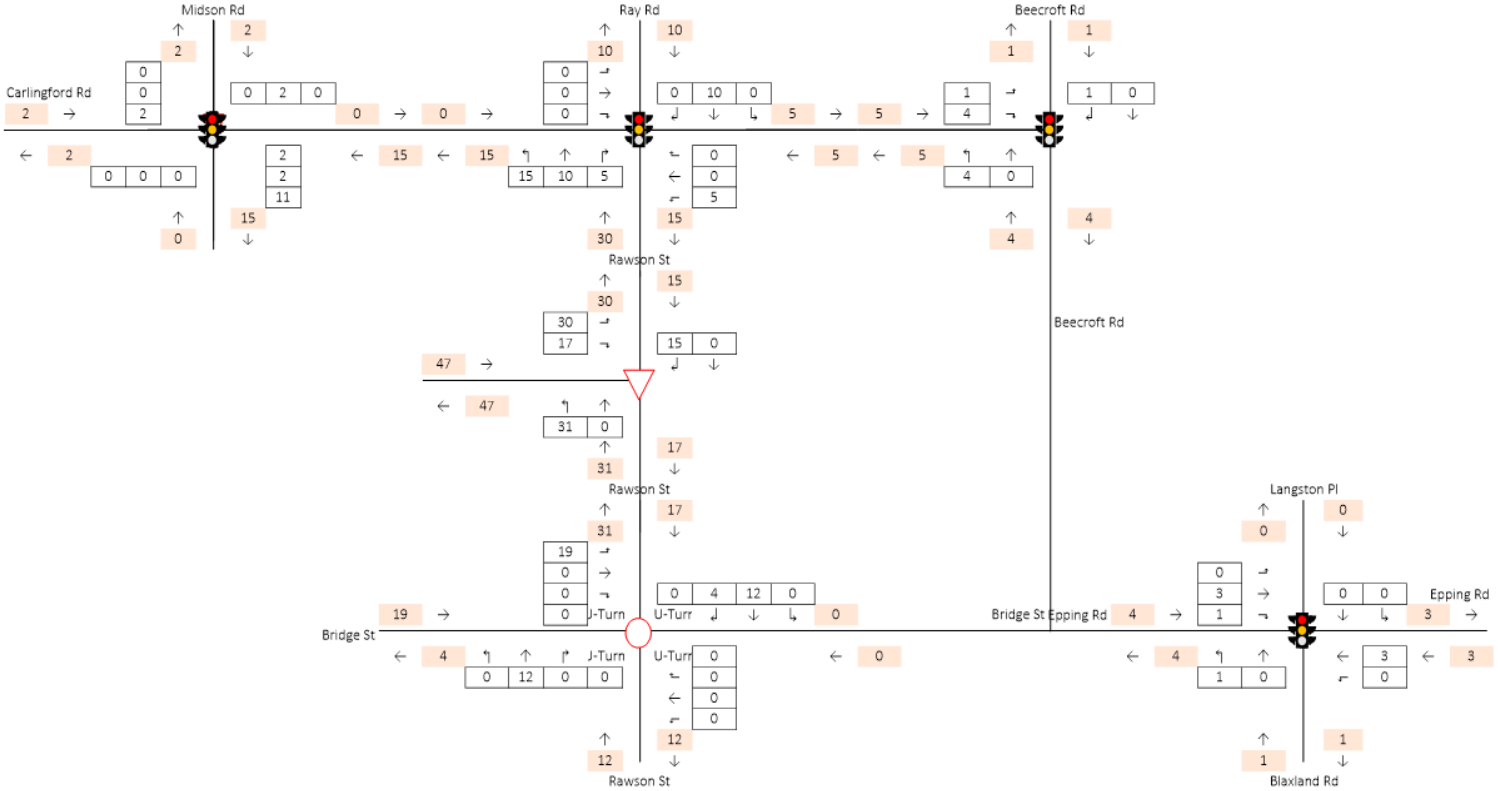
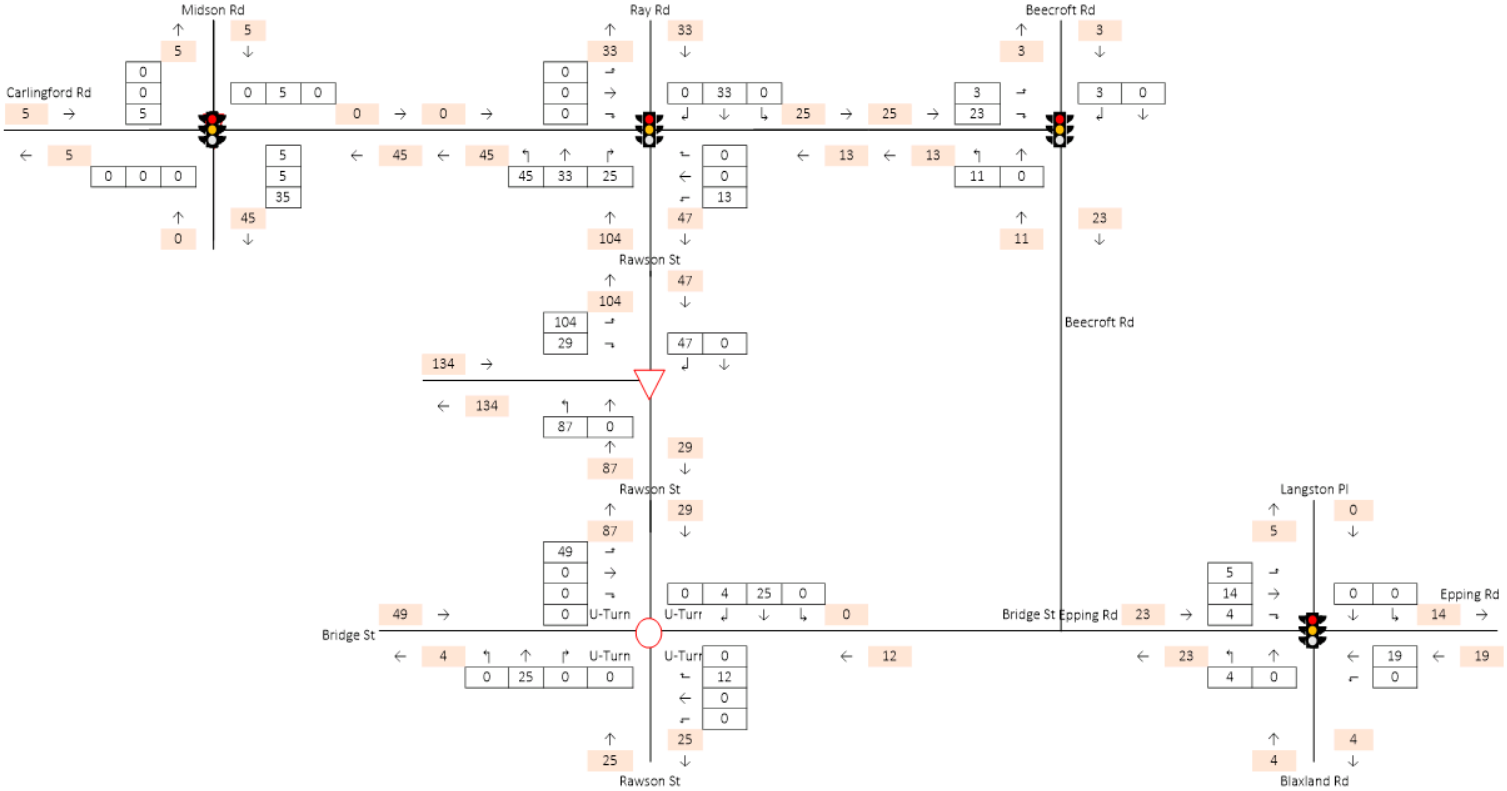


Existing Site (Office) PM



Existing Site (retail) AM



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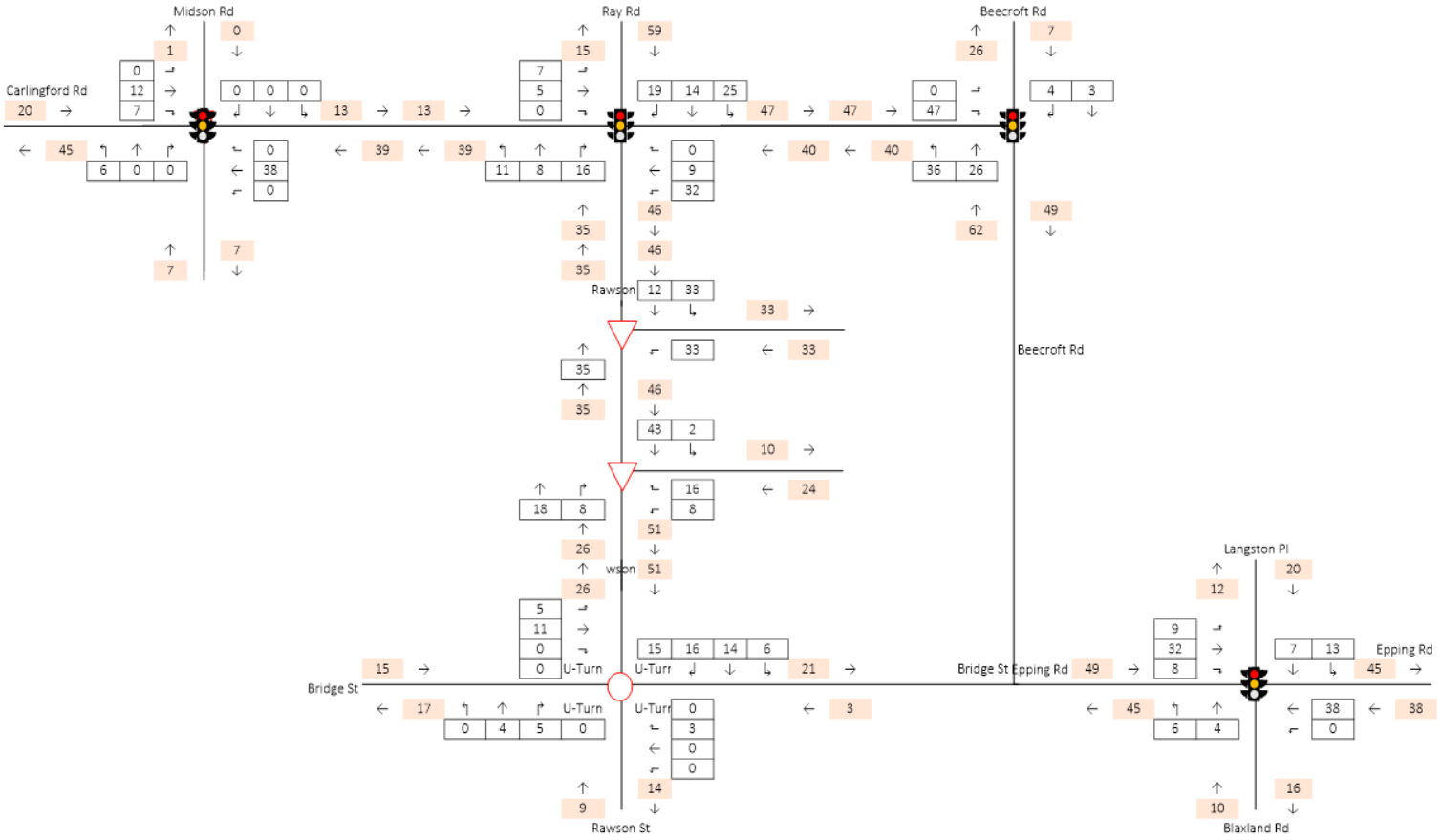
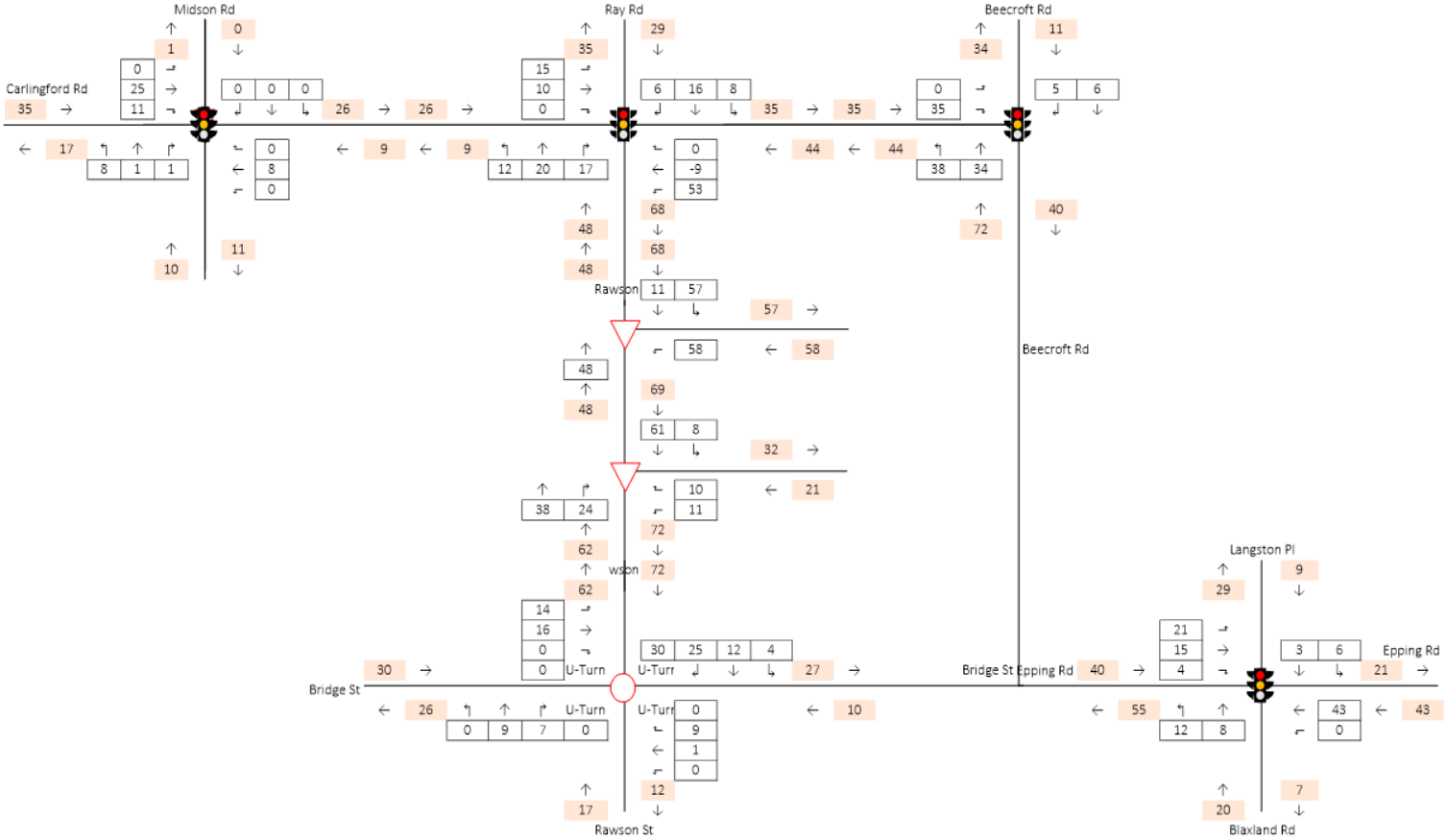


Other Developments AM



Other Developments PM

Appendix E. SIDRA Intersection Results

MOVEMENT SUMMARY

Site: 101 [X. Rawson St AM (Site Folder: 1 - Existing)]

Network: N101 [Existing AM (Network Folder: Scenario 1 Existing Conditions)]

New Site
Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson Street														
2	T1	427	1.2	427	1.2	0.982	30.7	LOS C	4.6	32.7	0.48	2.50	3.11	12.4
Approach		427	1.2	427	1.2	0.982	30.7	LOS C	4.6	32.7	0.48	2.50	3.11	12.4
North: Rawson Street														
8	T1	382	6.1	382	6.1	0.915	13.1	LOS A	1.9	14.2	0.37	1.23	1.40	17.8
Approach		382	6.1	382	6.1	0.915	13.1	LOS A	1.9	14.2	0.37	1.23	1.40	17.8
All Vehicles		809	3.5	809	3.5	0.982	22.4	NA	4.6	32.7	0.43	1.90	2.30	14.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 706 [1. Beecroft Rd/ Carlingford Rd AM (Site Folder: 1 - Existing)]

Network: N101 [Existing AM (Network Folder: Scenario 1 Existing Conditions)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Beecroft Road														
1	L2	721	4.8	721	4.8	0.495	11.0	LOS A	5.0	36.2	0.38	0.68	0.38	41.7
2	T1	1043	2.8	1043	2.8	* 0.953	64.1	LOS E	27.4	196.5	0.94	1.06	1.23	27.5
Approach		1765	3.6	1765	3.6	0.953	42.4	LOS C	27.4	196.5	0.71	0.91	0.88	30.0
North: Beecroft Road														
8	T1	1351	0.9	1351	0.9	0.631	24.0	LOS B	12.0	84.8	0.73	0.64	0.73	33.8
9	R2	209	6.5	209	6.5	* 0.979	113.4	LOS F	5.8	43.0	1.00	1.13	1.80	12.9
Approach		1560	1.7	1560	1.7	0.979	36.0	LOS C	12.0	84.8	0.76	0.71	0.87	27.7
West: Carlingford Road														
10	L2	69	12.1	69	12.1	0.963	77.0	LOS F	6.9	50.0	1.00	1.11	1.27	18.3
12	R2	1368	3.2	1368	3.2	* 0.963	72.6	LOS F	6.9	50.0	1.00	1.07	1.27	3.3
Approach		1437	3.7	1437	3.7	0.963	72.8	LOS F	6.9	50.0	1.00	1.07	1.27	4.4
All Vehicles		4762	3.0	4762	3.0	0.979	49.5	LOS D	27.4	196.5	0.82	0.89	1.00	21.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Beecroft Road											
P1B	Slip/ Bypass	53	59.3	LOS E	0.2	0.2	0.96	0.96	81.8	27.0	0.33
West: Carlingford Road											
P4	Full	7	59.2	LOS E	0.0	0.0	0.95	0.95	88.3	35.0	0.40
All Pedestrians		60	59.3	LOS E	0.2	0.2	0.96	0.96	82.6	28.0	0.34

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 1015 [2. Carlingford Rd/ Ray Rd/ Rawson St AM (Site Folder: 1 - Existing)]

Network: N101 [Existing AM (Network Folder: Scenario 1 Existing Conditions)]

NRT 6AM - 10AM, 3PM - 7PM
N Leg Parking Restrictions AM
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson St														
1	L2	87	1.2	87	1.2	0.307	42.0	LOS C	5.7	40.4	0.82	0.72	0.82	11.6
2	T1	127	0.8	127	0.8	* 0.945	47.4	LOS D	5.7	40.4	0.85	0.79	0.97	24.5
3	R2	65	6.5	65	6.5	0.945	99.7	LOS F	4.5	32.7	1.00	1.12	1.71	5.4
Approach		280	2.3	280	2.3	0.945	57.9	LOS E	5.7	40.4	0.87	0.85	1.10	16.4
East: Carlingford Rd														
4	L2	120	14.0	120	14.0	0.458	21.3	LOS B	6.8	50.0	0.67	0.64	0.67	10.6
5	T1	800	3.4	800	3.4	0.458	19.7	LOS B	6.9	50.0	0.71	0.65	0.71	9.8
6	R2	4	100.0	4	100.0	0.458	25.5	LOS B	6.9	50.0	0.74	0.66	0.74	32.0
Approach		924	5.2	924	5.2	0.458	20.0	LOS B	6.9	50.0	0.70	0.65	0.70	10.2
North: Ray Rd														
7	L2	228	1.4	228	1.4	0.836	63.5	LOS E	9.8	69.3	1.00	0.98	1.23	18.5
8	T1	183	3.4	183	3.4	0.436	44.7	LOS D	6.4	46.3	0.89	0.75	0.89	22.6
9	R2	12	9.1	12	9.1	0.436	49.3	LOS D	6.4	46.3	0.89	0.75	0.89	22.6
Approach		423	2.5	423	2.5	0.836	55.0	LOS D	9.8	69.3	0.95	0.87	1.07	20.2
West: Carlingford Rd														
10	L2	13	0.0	13	0.0	0.865	42.5	LOS D	22.2	160.0	0.92	0.94	1.04	39.2
11	T1	1099	3.4	1099	3.4	* 0.865	37.5	LOS C	22.2	160.0	0.92	0.94	1.04	35.0
12	R2	2	100.0	2	100.0	0.865	44.4	LOS D	21.8	157.7	0.91	0.95	1.05	34.8
Approach		1114	3.6	1114	3.6	0.865	37.6	LOS C	22.2	160.0	0.92	0.94	1.04	35.0
All Vehicles		2742	3.8	2742	3.8	0.945	36.4	LOS C	22.2	160.0	0.84	0.82	0.94	26.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Rawson St											
P1	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	87.8	34.2	0.39
East: Carlingford Rd											
P2	Full	168	59.6	LOS E	0.6	0.6	0.96	0.96	88.6	34.8	0.39

North: Ray Rd										
P3	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	87.1	33.4	0.38
West: Carlingford Rd										
P4	Full	316	59.9	LOS E	1.1	1.1	0.97	0.97	88.9	34.8	0.39
All Pedestrians		589	59.7	LOS E	1.1	1.1	0.96	0.96	88.6	34.6	0.39

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 3 [3. Rawson St/ Bridge St AM (Site Folder: 1 - Existing)] **Network: N101 [Existing AM (Network Folder: Scenario 1 Existing Conditions)]**

Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson Street														
1	L2	8	0.0	8	0.0	0.441	10.5	LOS A	1.1	7.8	0.74	0.89	0.81	42.8
2	T1	128	0.8	128	0.8	0.441	10.4	LOS A	1.1	7.8	0.74	0.89	0.81	38.1
3	R2	79	0.0	79	0.0	0.441	14.2	LOS A	1.1	7.8	0.74	0.89	0.81	38.3
Approach		216	0.5	216	0.5	0.441	11.8	LOS A	1.1	7.8	0.74	0.89	0.81	38.5
East: Bridge Street														
4	L2	37	0.0	37	0.0	0.497	10.9	LOS A	1.4	9.9	0.77	0.92	0.88	38.7
5	T1	124	2.5	124	2.5	0.497	10.9	LOS A	1.4	9.9	0.77	0.92	0.88	39.7
6	R2	81	1.3	81	1.3	0.497	14.5	LOS A	1.4	9.9	0.77	0.92	0.88	20.3
6u	U	2	0.0	2	0.0	0.497	16.0	LOS B	1.4	9.9	0.77	0.92	0.88	12.3
Approach		244	1.7	244	1.7	0.497	12.1	LOS A	1.4	9.9	0.77	0.92	0.88	36.2
North: Rawson Street														
7	L2	43	31.7	43	31.7	0.639	11.7	LOS A	2.4	17.7	0.78	0.88	0.92	29.8
8	T1	154	0.7	154	0.7	0.639	10.3	LOS A	2.4	17.7	0.78	0.88	0.92	40.5
9	R2	158	5.3	158	5.3	0.639	14.1	LOS A	2.4	17.7	0.78	0.88	0.92	40.6
9u	U	28	0.0	28	0.0	0.639	15.4	LOS B	2.4	17.7	0.78	0.88	0.92	26.8
Approach		383	6.0	383	6.0	0.639	12.4	LOS A	2.4	17.7	0.78	0.88	0.92	39.3
West: Bridge Street														
10	L2	191	1.7	191	1.7	0.645	12.6	LOS A	2.4	17.1	0.83	0.98	1.05	37.0
11	T1	124	4.2	124	4.2	0.645	12.9	LOS A	2.4	17.1	0.83	0.98	1.05	38.9
12	R2	21	0.0	21	0.0	0.645	16.3	LOS B	2.4	17.1	0.83	0.98	1.05	42.7
12u	U	14	0.0	14	0.0	0.645	17.9	LOS B	2.4	17.1	0.83	0.98	1.05	43.2
Approach		349	2.4	349	2.4	0.645	13.2	LOS A	2.4	17.1	0.83	0.98	1.05	38.6
All Vehicles		1193	3.1	1193	3.1	0.645	12.5	LOS A	2.4	17.7	0.78	0.92	0.93	38.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 216 [4. Blaxland Rd/ Epping Rd - AM (Site Folder: 1 - Existing)]

Network: N101 [Existing AM (Network Folder: Scenario 1 Existing Conditions)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Blaxland Rd														
21a	L1	582	4.3	582	4.3	0.321	24.5	LOS B	6.6	48.1	0.63	0.75	0.63	33.4
22	T1	185	3.4	185	3.4	0.681	59.7	LOS E	7.1	50.8	1.00	0.84	1.03	28.8
Approach		767	4.1	767	4.1	0.681	33.0	LOS C	7.1	50.8	0.72	0.77	0.73	31.5
East: Epping Rd														
4b	L3	20	5.3	20	5.3	0.041	40.0	LOS C	0.5	3.9	0.73	0.70	0.73	35.9
5	T1	1209	3.3	1209	3.3	* 0.837	43.0	LOS D	22.6	161.8	0.98	0.93	1.04	25.1
Approach		1229	3.4	1229	3.4	0.837	42.9	LOS D	22.6	162.6	0.97	0.92	1.03	25.3
NorthWest: Langston Pl														
27a	L1	31	13.8	31	13.8	0.524	64.7	LOS E	3.9	28.3	0.99	0.78	0.99	27.8
28	T1	265	1.6	265	1.6	* 0.698	59.5	LOS E	7.4	52.7	1.00	0.83	1.03	28.9
Approach		296	2.8	296	2.8	0.698	60.1	LOS E	7.4	52.7	1.00	0.83	1.03	28.8
West: Epping Rd														
10b	L3	320	3.9	320	3.9	0.801	13.2	LOS A	13.1	93.6	0.46	0.59	0.46	47.9
11	T1	1841	1.8	1841	1.8	0.801	6.6	LOS A	21.9	155.3	0.48	0.50	0.48	52.9
12a	R1	527	1.6	527	1.6	* 0.964	60.3	LOS E	18.1	128.1	1.00	1.08	1.32	28.4
Approach		2687	2.0	2687	2.0	0.964	17.9	LOS B	21.9	155.3	0.58	0.62	0.64	44.7
All Vehicles		4979	2.7	4979	2.7	0.964	28.9	LOS C	22.6	162.6	0.72	0.73	0.77	36.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: Blaxland Rd											
P5	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	226.5	217.4	0.96
East: Epping Rd											
P2	Full	242	59.7	LOS E	0.9	0.9	0.96	0.96	227.7	218.4	0.96
NorthWest: Langston Pl											
P7	Full	232	59.7	LOS E	0.8	0.8	0.96	0.96	223.2	212.5	0.95
All Pedestrians		526	59.7	LOS E	0.9	0.9	0.96	0.96	225.6	215.7	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 1068 [5. Midson Rd/ Carlingford Rd - AM (Site Folder: 1 - Existing)] **Network: N101 [Existing AM (Network Folder: Scenario 1 Existing Conditions)]**

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 125 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Midson Rd														
1	L2	48	2.2	48	2.2	0.488	50.4	LOS D	6.8	47.9	0.92	0.78	0.92	31.6
2	T1	299	0.4	299	0.4	* 0.813	50.2	LOS D	12.3	88.1	0.96	0.85	1.02	29.2
3	R2	182	4.0	182	4.0	0.813	59.9	LOS E	12.3	88.1	1.00	0.93	1.12	19.6
Approach		529	1.8	529	1.8	0.813	53.6	LOS D	12.3	88.1	0.97	0.87	1.05	26.7
East: Carlingford Rd														
4	L2	44	4.8	44	4.8	0.846	58.5	LOS E	16.3	118.5	1.00	0.98	1.14	34.7
5	T1	759	4.2	759	4.2	0.846	52.5	LOS D	16.3	118.5	0.99	0.97	1.14	36.6
6	R2	142	2.2	142	2.2	0.427	32.6	LOS C	3.1	22.0	0.92	0.79	0.92	40.6
Approach		945	3.9	945	3.9	0.846	49.8	LOS D	16.3	118.5	0.98	0.94	1.10	37.1
North: Midson Rd														
7	L2	32	0.0	32	0.0	0.523	57.4	LOS E	5.2	36.4	0.96	0.83	0.96	20.5
8	T1	335	0.0	335	0.0	* 0.871	60.7	LOS E	10.8	75.7	0.99	0.95	1.15	27.2
9	R2	53	0.0	53	0.0	0.871	69.9	LOS E	10.8	75.7	1.00	1.03	1.26	27.1
Approach		419	0.0	419	0.0	0.871	61.6	LOS E	10.8	75.7	0.99	0.95	1.15	26.8
West: Carlingford Rd														
10	L2	22	0.0	22	0.0	* 0.895	65.2	LOS E	19.4	140.5	1.00	1.05	1.22	28.7
11	T1	822	4.1	822	4.1	0.895	59.4	LOS E	19.4	140.5	0.98	1.04	1.23	20.6
12	R2	237	1.8	237	1.8	* 0.673	33.8	LOS C	5.5	39.0	0.98	0.83	0.99	36.0
Approach		1081	3.5	1081	3.5	0.895	53.9	LOS D	19.4	140.5	0.98	0.99	1.17	24.4
All Vehicles		2975	2.8	2975	2.8	0.895	53.6	LOS D	19.4	140.5	0.98	0.95	1.13	29.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Midson Rd											
P1	Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	223.2	216.4	0.97
East: Carlingford Rd											
P2	Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	223.2	216.4	0.97
North: Midson Rd											
P3	Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	219.7	211.8	0.96

All Pedestrians	158	56.8	LOS E	0.2	0.2	0.95	0.95	222.1	214.9	0.97

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 101 [X. Rawson St PM (Site Folder: 1 - Existing)]

Network: N101 [Existing PM (Network Folder: Scenario 1 Existing Conditions)]

New Site
Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson St														
2	T1	335	0.0	335	0.0	0.993	39.0	LOS C	3.9	38.6	0.53	3.32	4.04	10.7
Approach		335	0.0	335	0.0	0.993	39.0	LOS C	3.9	38.6	0.53	3.32	4.04	10.7
North: Rawson St														
8	T1	269	5.9	269	5.9	0.847	10.4	LOS A	0.9	6.7	0.44	1.03	1.16	19.5
Approach		269	5.9	269	5.9	0.847	10.4	LOS A	0.9	6.7	0.44	1.03	1.16	19.5
All Vehicles		604	2.6	604	2.6	0.993	26.2	NA	3.9	38.6	0.49	2.30	2.76	13.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 706 [1. Beecroft Rd/ Carlingford Rd PM (Site Folder: 1 - Existing)]

Network: N101 [Existing PM (Network Folder: Scenario 1 Existing Conditions)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Beecroft Road														
1	L2	896	4.5	896	4.5	0.604	13.0	LOS A	7.7	56.1	0.48	0.72	0.48	39.4
2	T1	1281	1.5	1281	1.5	* 0.983	75.6	LOS F	39.0	276.7	0.94	1.12	1.29	25.1
Approach		2177	2.7	2177	2.7	0.983	49.8	LOS D	39.0	276.7	0.75	0.96	0.96	27.5
North: Beecroft Road														
8	T1	751	1.6	751	1.6	0.195	14.2	LOS A	4.6	32.5	0.52	0.44	0.52	41.1
9	R2	295	5.7	295	5.7	* 0.961	102.5	LOS F	7.8	57.1	1.00	1.09	1.65	13.9
Approach		1045	2.8	1045	2.8	0.961	39.1	LOS C	7.8	57.1	0.65	0.62	0.84	26.5
West: Carlingford Road														
10	L2	89	4.7	89	4.7	0.898	66.5	LOS E	7.0	50.0	1.00	1.07	1.15	20.2
12	R2	1015	1.4	1015	1.4	* 0.898	64.9	LOS E	7.1	50.0	1.00	1.02	1.17	3.7
Approach		1104	1.7	1104	1.7	0.898	65.0	LOS E	7.1	50.0	1.00	1.02	1.17	5.6
All Vehicles		4327	2.5	4327	2.5	0.983	51.1	LOS D	39.0	276.7	0.79	0.89	0.98	22.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Beecroft Road											
P1B	Slip/ Bypass	53	59.3	LOS E	0.2	0.2	0.96	0.96	81.8	27.0	0.33
West: Carlingford Road											
P4	Full	7	59.2	LOS E	0.0	0.0	0.95	0.95	88.3	35.0	0.40
All Pedestrians		60	59.3	LOS E	0.2	0.2	0.96	0.96	82.6	28.0	0.34

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 1015 [2. Carlingford Rd/ Ray Rd/ Rawson St PM (Site Folder: 1 - Existing)]

Network: N101 [Existing PM (Network Folder: Scenario 1 Existing Conditions)]

NRT 6AM - 10AM, 3PM - 7PM
N Leg Parking Restrictions AM
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson St														
1	L2	87	1.2	87	1.2	0.390	47.0	LOS D	6.2	43.7	0.87	0.76	0.87	10.6
2	T1	131	0.0	131	0.0	* 0.866	48.1	LOS D	6.2	43.7	0.89	0.81	0.97	24.4
3	R2	96	0.0	96	0.0	0.866	79.8	LOS F	5.5	38.5	1.00	1.05	1.43	6.5
Approach		313	0.3	313	0.3	0.866	57.5	LOS E	6.2	43.7	0.92	0.87	1.08	16.0
East: Carlingford Rd														
4	L2	104	10.1	104	10.1	0.532	19.5	LOS B	6.9	50.0	0.63	0.60	0.63	11.7
5	T1	1077	3.9	1077	3.9	0.532	16.2	LOS B	6.9	50.0	0.64	0.59	0.64	11.6
6	R2	4	100.0	4	100.0	0.532	20.5	LOS B	6.9	50.0	0.64	0.58	0.64	34.6
Approach		1185	4.8	1185	4.8	0.532	16.5	LOS B	6.9	50.0	0.63	0.59	0.63	11.8
North: Ray Rd														
7	L2	137	0.8	137	0.8	0.572	50.9	LOS D	4.8	33.6	0.92	0.81	0.92	21.1
8	T1	96	4.4	96	4.4	0.271	43.5	LOS D	3.5	25.8	0.86	0.70	0.86	22.9
9	R2	16	6.7	16	6.7	0.271	48.1	LOS D	3.5	25.8	0.86	0.70	0.86	22.9
Approach		249	2.5	249	2.5	0.572	47.9	LOS D	4.8	33.6	0.89	0.76	0.89	21.8
West: Carlingford Rd														
10	L2	23	0.0	23	0.0	0.727	24.3	LOS B	13.2	94.4	0.75	0.69	0.75	45.7
11	T1	813	2.2	813	2.2	* 0.727	18.8	LOS B	13.2	94.4	0.75	0.69	0.75	44.1
12	R2	2	100.0	2	100.0	0.727	25.1	LOS B	12.2	87.4	0.75	0.69	0.75	44.1
Approach		838	2.4	838	2.4	0.727	19.0	LOS B	13.2	94.4	0.75	0.69	0.75	44.1
All Vehicles		2585	3.2	2585	3.2	0.866	25.3	LOS B	13.2	94.4	0.73	0.67	0.75	29.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Rawson St											
P1	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	87.8	34.2	0.39
East: Carlingford Rd											
P2	Full	105	59.4	LOS E	0.4	0.4	0.96	0.96	88.4	34.8	0.39

North: Ray Rd										
P3	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	87.1	33.4	0.38
West: Carlingford Rd										
P4	Full	211	59.7	LOS E	0.7	0.7	0.96	0.96	88.7	34.8	0.39
All Pedestrians		421	59.5	LOS E	0.7	0.7	0.96	0.96	88.3	34.6	0.39

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 3 [3. Rawson St/ Bridge St PM (Site Folder: 1 - Existing)] **Network: N101 [Existing PM (Network Folder: Scenario 1 Existing Conditions)]**

Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson Street														
1	L2	28	0.0	28	0.0	0.411	12.3	LOS A	1.0	6.9	0.79	0.94	0.88	41.9
2	T1	72	0.0	72	0.0	0.411	12.2	LOS A	1.0	6.9	0.79	0.94	0.88	36.8
3	R2	60	0.0	60	0.0	0.411	16.0	LOS B	1.0	6.9	0.79	0.94	0.88	27.2
3u	U	6	0.0	6	0.0	0.411	19.0	LOS B	1.0	6.9	0.79	0.94	0.88	45.4
Approach		166	0.0	166	0.0	0.411	13.9	LOS A	1.0	6.9	0.79	0.94	0.88	34.2
East: Bridge Street														
4	L2	42	0.0	42	0.0	0.718	12.5	LOS A	3.2	22.6	0.85	0.95	1.08	37.8
5	T1	281	0.4	281	0.4	0.718	12.4	LOS A	3.2	22.6	0.85	0.95	1.08	38.8
6	R2	122	0.0	122	0.0	0.718	16.0	LOS B	3.2	22.6	0.85	0.95	1.08	19.1
6u	U	2	0.0	2	0.0	0.718	17.6	LOS B	3.2	22.6	0.85	0.95	1.08	12.1
Approach		447	0.2	447	0.2	0.718	13.4	LOS A	3.2	22.6	0.85	0.95	1.08	36.0
North: Rawson Street														
7	L2	47	17.8	47	17.8	0.366	5.9	LOS A	0.9	6.9	0.47	0.61	0.47	35.4
8	T1	99	1.1	99	1.1	0.366	5.3	LOS A	0.9	6.9	0.47	0.61	0.47	44.2
9	R2	105	6.0	105	6.0	0.366	9.0	LOS A	0.9	6.9	0.47	0.61	0.47	44.2
9u	U	18	0.0	18	0.0	0.366	10.4	LOS A	0.9	6.9	0.47	0.61	0.47	33.1
Approach		269	5.9	269	5.9	0.366	7.2	LOS A	0.9	6.9	0.47	0.61	0.47	43.0
West: Bridge Street														
10	L2	123	0.0	123	0.0	0.314	7.1	LOS A	0.7	4.9	0.60	0.71	0.60	41.4
11	T1	36	2.9	36	2.9	0.314	7.4	LOS A	0.7	4.9	0.60	0.71	0.60	43.0
12	R2	14	0.0	14	0.0	0.314	10.9	LOS A	0.7	4.9	0.60	0.71	0.60	45.5
12u	U	9	0.0	9	0.0	0.314	12.5	LOS A	0.7	4.9	0.60	0.71	0.60	46.1
Approach		182	0.6	182	0.6	0.314	7.7	LOS A	0.7	4.9	0.60	0.71	0.60	42.6
All Vehicles		1065	1.7	1065	1.7	0.718	10.9	LOS A	3.2	22.6	0.70	0.82	0.81	38.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 216 [4. Blaxland Rd/ Epping Rd - PM (Site Folder: 1 - Existing)]

Network: N101 [Existing PM (Network Folder: Scenario 1 Existing Conditions)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Blaxland Rd														
21a	L1	956	0.9	956	0.9	* 0.949	78.5	LOS F	27.6	194.3	0.99	1.06	1.36	16.9
22	T1	105	3.0	105	3.0	0.508	58.1	LOS E	3.9	28.0	0.97	0.78	0.97	29.2
Approach		1061	1.1	1061	1.1	0.949	76.5	LOS F	27.6	194.3	0.99	1.04	1.32	18.2
East: Epping Rd														
4b	L3	13	0.0	13	0.0	0.019	30.6	LOS C	0.3	2.0	0.62	0.68	0.62	39.5
5	T1	1556	2.5	1556	2.5	* 0.911	47.8	LOS D	34.8	250.1	1.00	1.04	1.15	23.5
Approach		1568	2.5	1568	2.5	0.911	47.7	LOS D	34.8	250.1	1.00	1.04	1.15	23.7
NorthWest: Langston Pl														
27a	L1	25	4.2	25	4.2	0.446	64.0	LOS E	3.3	24.0	0.98	0.77	0.98	28.0
28	T1	186	2.8	186	2.8	0.446	57.2	LOS E	4.5	31.8	0.97	0.77	0.97	29.5
Approach		212	3.0	212	3.0	0.446	58.0	LOS E	4.5	31.8	0.97	0.77	0.97	29.3
West: Epping Rd														
10b	L3	423	1.2	423	1.2	0.523	8.7	LOS A	2.9	20.7	0.18	0.51	0.18	49.9
11	T1	1066	2.0	1066	2.0	0.523	2.7	LOS A	5.4	38.0	0.19	0.25	0.19	56.2
12a	R1	312	0.7	312	0.7	0.978	76.6	LOS F	11.6	81.4	1.00	1.14	1.45	24.9
Approach		1801	1.6	1801	1.6	0.978	16.9	LOS B	11.6	81.4	0.32	0.47	0.40	45.0
All Vehicles		4641	1.9	4641	1.9	0.978	42.8	LOS D	34.8	250.1	0.73	0.80	0.89	29.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: Blaxland Rd											
P5	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	226.5	217.4	0.96
East: Epping Rd											
P2	Full	168	59.6	LOS E	0.6	0.6	0.96	0.96	227.6	218.4	0.96
NorthWest: Langston Pl											
P7	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	222.7	212.5	0.95
All Pedestrians		274	59.4	LOS E	0.6	0.6	0.96	0.96	226.4	217.1	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 1068 [5. Midson Rd/ Carlingford Rd - PM (Site Folder: 1 - Existing)] **Network: N101 [Existing PM (Network Folder: Scenario 1 Existing Conditions)]**

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Midson Rd														
1	L2	109	2.9	109	2.9	0.565	42.7	LOS D	7.9	56.1	0.92	0.80	0.92	33.6
2	T1	407	0.3	407	0.3	* 0.942	55.4	LOS D	17.4	123.5	0.97	1.01	1.22	28.1
3	R2	176	4.2	176	4.2	0.942	72.1	LOS F	17.4	123.5	1.00	1.15	1.42	17.5
Approach		693	1.7	693	1.7	0.942	57.7	LOS E	17.4	123.5	0.97	1.01	1.22	26.5
East: Carlingford Rd														
4	L2	65	1.6	65	1.6	0.945	72.0	LOS F	21.4	154.6	1.00	1.18	1.40	31.7
5	T1	891	4.4	891	4.4	* 0.945	66.2	LOS E	21.4	154.6	1.00	1.18	1.41	33.2
6	R2	184	0.0	184	0.0	* 0.536	28.7	LOS C	3.8	26.7	0.89	0.80	0.89	41.9
Approach		1140	3.5	1140	3.5	0.945	60.5	LOS E	21.4	154.6	0.98	1.12	1.33	34.3
North: Midson Rd														
7	L2	39	2.7	39	2.7	0.556	50.8	LOS D	3.7	26.3	0.99	0.83	0.99	21.9
8	T1	261	1.6	261	1.6	* 0.926	61.1	LOS E	8.8	62.0	0.99	1.02	1.31	27.0
9	R2	49	0.0	49	0.0	0.926	73.5	LOS F	8.8	62.0	1.00	1.13	1.49	26.3
Approach		349	1.5	349	1.5	0.926	61.7	LOS E	8.8	62.0	0.99	1.02	1.30	26.6
West: Carlingford Rd														
10	L2	42	0.0	42	0.0	0.600	41.1	LOS C	9.4	66.9	0.91	0.79	0.91	35.2
11	T1	628	2.5	628	2.5	0.600	35.5	LOS C	9.5	68.2	0.91	0.79	0.91	27.8
12	R2	201	0.5	201	0.5	0.754	36.1	LOS C	4.5	31.4	1.00	0.85	1.12	35.2
Approach		872	1.9	872	1.9	0.754	36.0	LOS C	9.5	68.2	0.93	0.80	0.96	30.6
All Vehicles		3054	2.4	3054	2.4	0.945	53.0	LOS D	21.4	154.6	0.97	0.99	1.20	30.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Midson Rd											
P1	Full	53	49.3	LOS E	0.2	0.2	0.95	0.95	215.7	216.4	1.00
East: Carlingford Rd											
P2	Full	53	49.3	LOS E	0.2	0.2	0.95	0.95	215.7	216.4	1.00
North: Midson Rd											
P3	Full	53	49.3	LOS E	0.2	0.2	0.95	0.95	212.2	211.8	1.00

All Pedestrians	158	49.3	LOS E	0.2	0.2	0.95	0.95	214.6	214.9	1.00

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 101v [XM. Rawson St AM - Pedestrian Operated Signals (Site Folder: 2 - Post Development)]

Network: N101 [Sc. 2 AM - with POS mitigation (Network Folder: Scenario 2 Pdev)]

New Site
Site Category: (None)
Pedestrian Crossing (Signalised) - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 40 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson Street														
2	T1	504	1.0	504	1.0	* 0.606	9.9	LOS A	4.8	34.2	0.83	0.72	0.83	28.3
Approach		504	1.0	504	1.0	0.606	9.9	LOS A	4.8	34.2	0.83	0.72	0.83	28.3
North: Rawson Street														
8	T1	398	5.8	398	5.8	0.493	9.3	LOS A	3.6	26.3	0.77	0.66	0.77	14.9
Approach		398	5.8	398	5.8	0.493	9.3	LOS A	3.6	26.3	0.77	0.66	0.77	14.9
All Vehicles		902	3.2	902	3.2	0.606	9.7	LOS A	4.8	34.2	0.80	0.69	0.80	24.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Rawson Street											
P1	Full	858	15.0	LOS B	0.9	0.9	0.88	0.88	175.8	209.0	1.19
All Pedestrians		858	15.0	LOS B	0.9	0.9	0.88	0.88	175.8	209.0	1.19

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 706 [1. Beecroft Rd/ Carlingford Rd AM (Site Folder: 2 - Post Development)]

Network: N101 [Sc. 2 AM - with POS mitigation (Network Folder: Scenario 2 Pdev)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Beecroft Road														
1	L2	725	4.7	725	4.7	0.503	11.4	LOS A	5.2	37.8	0.40	0.69	0.40	41.2
2	T1	1043	2.8	1043	2.8	* 0.971	71.9	LOS F	28.8	206.5	0.95	1.11	1.30	25.8
Approach		1769	3.6	1769	3.6	0.971	47.1	LOS D	28.8	206.5	0.72	0.94	0.93	28.4
North: Beecroft Road														
8	T1	1351	0.9	1351	0.9	0.636	24.0	LOS B	12.1	85.3	0.73	0.64	0.73	33.8
9	R2	223	6.1	223	6.1	* 0.979	113.2	LOS F	6.2	45.7	1.00	1.13	1.78	12.9
Approach		1574	1.7	1574	1.7	0.979	36.7	LOS C	12.1	85.3	0.77	0.71	0.88	27.5
West: Carlingford Road														
10	L2	78	10.8	76	10.7	0.963	77.5	LOS F	6.9	50.0	1.00	1.11	1.27	18.2
12	R2	1399	3.2	1365	3.2	* 0.963	73.4	LOS F	7.0	50.0	1.00	1.07	1.27	3.3
Approach		1477	3.6	1441 N1	3.6	0.963	73.6	LOS F	7.0	50.0	1.00	1.07	1.27	4.4
All Vehicles		4819	3.0	4783 N1	3.0	0.979	51.7	LOS D	28.8	206.5	0.82	0.90	1.01	20.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Beecroft Road											
P1B	Slip/ Bypass	53	59.3	LOS E	0.2	0.2	0.96	0.96	81.8	27.0	0.33
West: Carlingford Road											
P4	Full	7	59.2	LOS E	0.0	0.0	0.95	0.95	88.3	35.0	0.40
All Pedestrians		60	59.3	LOS E	0.2	0.2	0.96	0.96	82.6	28.0	0.34

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 1015 [2. Carlingford Rd/ Ray Rd/ Rawson St AM (Site Folder: 2 - Post Development)]

Network: N101 [Sc. 2 AM - with POS mitigation (Network Folder: Scenario 2 Pdev)]

NRT 6AM - 10AM, 3PM - 7PM
N Leg Parking Restrictions AM
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson St														
1	L2	116	0.9	116	0.9	0.411	44.1	LOS D	7.8	55.1	0.85	0.76	0.85	7.7
2	T1	136	0.8	136	0.8	0.411	39.5	LOS C	7.8	55.1	0.85	0.76	0.85	25.6
3	R2	108	3.9	108	3.9	1.545	555.8	LOS F	12.4	90.0	1.00	1.92	3.75	0.6
Approach		360	1.8	360	1.8	1.545	196.5	LOS F	12.4	90.0	0.90	1.11	1.73	4.7
East: Carlingford Rd														
4	L2	140	12.0	140	12.0	0.460	20.7	LOS B	6.8	50.0	0.62	0.62	0.62	10.9
5	T1	798	3.4	798	3.4	0.460	18.8	LOS B	6.9	50.0	0.67	0.63	0.67	10.2
6	R2	4	100.0	4	100.0	0.460	24.2	LOS B	6.9	50.0	0.72	0.64	0.72	32.6
Approach		942	5.1	942	5.1	0.460	19.1	LOS B	6.9	50.0	0.67	0.63	0.67	10.5
North: Ray Rd														
7	L2	228	1.4	228	1.4	* 0.858	67.7	LOS E	10.1	71.9	1.00	1.00	1.28	17.7
8	T1	187	3.4	187	3.4	0.391	40.3	LOS C	6.2	44.9	0.85	0.72	0.85	23.9
9	R2	12	9.1	12	9.1	0.391	44.8	LOS D	6.2	44.9	0.85	0.72	0.85	23.9
Approach		427	2.5	427	2.5	0.858	55.0	LOS D	10.1	71.9	0.93	0.87	1.08	20.1
West: Carlingford Rd														
10	L2	13	0.0	13	0.0	* 0.853	39.4	LOS C	21.7	156.3	0.90	0.91	1.00	40.2
11	T1	1098	3.4	1098	3.4	0.853	34.4	LOS C	21.7	157.0	0.90	0.91	1.01	36.2
12	R2	2	100.0	2	100.0	0.853	41.2	LOS C	21.7	157.0	0.90	0.92	1.01	36.0
Approach		1113	3.6	1113	3.6	0.853	34.5	LOS C	21.7	157.0	0.90	0.91	1.01	36.3
All Vehicles		2843	3.7	2843	3.7	1.545	53.0	LOS D	21.7	157.0	0.83	0.84	1.00	20.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Rawson St											
P1	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	87.8	34.2	0.39
East: Carlingford Rd											
P2	Full	168	59.6	LOS E	0.6	0.6	0.96	0.96	88.6	34.8	0.39

North: Ray Rd										
P3	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	87.1	33.4	0.38
West: Carlingford Rd										
P4	Full	316	59.9	LOS E	1.1	1.1	0.97	0.97	88.9	34.8	0.39
All Pedestrians		589	59.7	LOS E	1.1	1.1	0.96	0.96	88.6	34.6	0.39

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 3 [3. Rawson St/ Bridge St AM (Site Folder: 2 - Post Development)]

Network: N101 [Sc. 2 AM - with POS mitigation (Network Folder: Scenario 2 Pdev)]

Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson Street														
1	L2	8	0.0	8	0.0	0.476	11.6	LOS A	1.3	9.1	0.77	0.93	0.89	42.3
2	T1	140	0.8	140	0.8	0.476	11.6	LOS A	1.3	9.1	0.77	0.93	0.89	37.3
3	R2	79	0.0	79	0.0	0.476	15.3	LOS B	1.3	9.1	0.77	0.93	0.89	37.6
Approach		227	0.5	227	0.5	0.476	12.9	LOS A	1.3	9.1	0.77	0.93	0.89	37.7
East: Bridge Street														
4	L2	37	0.0	37	0.0	0.537	11.7	LOS A	1.7	12.1	0.80	0.92	0.93	38.0
5	T1	124	2.5	124	2.5	0.537	11.7	LOS A	1.7	12.1	0.80	0.92	0.93	38.9
6	R2	112	0.9	112	0.9	0.537	15.2	LOS B	1.7	12.1	0.80	0.92	0.93	19.4
6u	U	2	0.0	2	0.0	0.537	16.8	LOS B	1.7	12.1	0.80	0.92	0.93	12.2
Approach		275	1.5	275	1.5	0.537	13.2	LOS A	1.7	12.1	0.80	0.92	0.93	34.5
North: Rawson Street														
7	L2	43	31.7	43	31.7	0.663	11.7	LOS A	2.2	16.4	0.61	0.82	0.73	30.0
8	T1	164	0.6	164	0.6	0.663	10.2	LOS A	2.2	16.4	0.61	0.82	0.73	40.6
9	R2	163	5.2	163	5.2	0.663	14.0	LOS A	2.2	16.4	0.61	0.82	0.73	40.7
9u	U	28	0.0	28	0.0	0.663	15.3	LOS B	2.2	16.4	0.61	0.82	0.73	27.0
Approach		399	5.8	399	5.8	0.663	12.3	LOS A	2.2	16.4	0.61	0.82	0.73	39.5
West: Bridge Street														
10	L2	224	1.4	224	1.4	0.742	17.2	LOS B	3.3	23.8	0.92	1.14	1.33	33.9
11	T1	124	4.2	124	4.2	0.742	17.5	LOS B	3.3	23.8	0.92	1.14	1.33	36.0
12	R2	21	0.0	21	0.0	0.742	20.8	LOS B	3.3	23.8	0.92	1.14	1.33	40.5
12u	U	14	0.0	14	0.0	0.742	22.4	LOS B	3.3	23.8	0.92	1.14	1.33	41.0
Approach		383	2.2	383	2.2	0.742	17.7	LOS B	3.3	23.8	0.92	1.14	1.33	35.5
All Vehicles		1284	2.9	1284	2.9	0.742	14.2	LOS A	3.3	23.8	0.77	0.96	0.98	37.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 216 [4. Blaxland Rd/ Epping Rd - AM (Site Folder: 2 - Post Development)]

Network: N101 [Sc. 2 AM - with POS mitigation (Network Folder: Scenario 2 Pdev)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Blaxland Rd														
21a	L1	593	4.3	593	4.3	0.327	24.5	LOS B	6.8	49.2	0.63	0.75	0.63	33.3
22	T1	185	3.4	185	3.4	0.681	59.7	LOS E	7.1	50.8	1.00	0.84	1.03	28.8
Approach		778	4.1	778	4.1	0.681	32.9	LOS C	7.1	50.8	0.72	0.77	0.73	31.5
East: Epping Rd														
4b	L3	20	5.3	20	5.3	0.041	40.0	LOS C	0.5	3.9	0.73	0.70	0.73	35.9
5	T1	1231	3.3	1231	3.3	* 0.852	44.8	LOS D	23.7	169.2	0.99	0.95	1.07	24.5
Approach		1251	3.3	1251	3.3	0.852	44.7	LOS D	23.7	170.0	0.98	0.95	1.06	24.7
NorthWest: Langston Pl														
27a	L1	31	13.8	31	13.8	0.524	64.7	LOS E	3.9	28.3	0.99	0.78	0.99	27.8
28	T1	265	1.6	265	1.6	* 0.698	59.5	LOS E	7.4	52.7	1.00	0.83	1.03	28.9
Approach		296	2.8	296	2.8	0.698	60.1	LOS E	7.4	52.7	1.00	0.83	1.03	28.8
West: Epping Rd														
10b	L3	320	3.9	316	3.9	0.801	13.3	LOS A	13.1	94.2	0.46	0.59	0.46	47.8
11	T1	1865	1.8	1843	1.8	0.801	6.7	LOS A	21.9	155.4	0.48	0.50	0.48	52.8
12a	R1	533	1.5	526	1.5	* 0.963	59.9	LOS E	18.0	127.6	1.00	1.08	1.31	28.5
Approach		2718	2.0	2684 N1	2.0	0.963	17.9	LOS B	21.9	155.4	0.58	0.62	0.64	44.8
All Vehicles		5043	2.7	5010 N1	2.7	0.963	29.4	LOS C	23.7	170.0	0.73	0.74	0.78	36.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: Blaxland Rd											
P5	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	226.5	217.4	0.96
East: Epping Rd											
P2	Full	242	59.7	LOS E	0.9	0.9	0.96	0.96	227.7	218.4	0.96
NorthWest: Langston Pl											
P7	Full	232	59.7	LOS E	0.8	0.8	0.96	0.96	223.2	212.5	0.95
All Pedestrians		526	59.7	LOS E	0.9	0.9	0.96	0.96	225.6	215.7	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 1068 [5. Midson Rd/ Carlingford Rd - AM (Site Folder: 2 - Post Development)]

Network: N101 [Sc. 2 AM - with POS mitigation (Network Folder: Scenario 2 Pdev)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 125 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Midson Rd														
1	L2	48	2.2	48	2.2	0.488	50.4	LOS D	6.8	47.9	0.92	0.78	0.92	31.6
2	T1	299	0.4	299	0.4	* 0.813	50.2	LOS D	12.3	88.1	0.96	0.85	1.02	29.2
3	R2	182	4.0	182	4.0	0.813	59.9	LOS E	12.3	88.1	1.00	0.93	1.12	19.6
Approach		529	1.8	529	1.8	0.813	53.6	LOS D	12.3	88.1	0.97	0.87	1.05	26.7
East: Carlingford Rd														
4	L2	46	4.5	46	4.5	0.876	62.6	LOS E	17.7	128.6	1.00	1.02	1.19	33.7
5	T1	783	4.0	783	4.0	0.876	56.6	LOS E	17.7	128.6	0.99	1.02	1.19	35.5
6	R2	142	2.2	142	2.2	0.411	32.0	LOS C	3.0	21.6	0.92	0.78	0.92	40.8
Approach		972	3.8	972	3.8	0.876	53.3	LOS D	17.7	128.6	0.98	0.98	1.15	36.1
North: Midson Rd														
7	L2	32	0.0	32	0.0	0.550	58.4	LOS E	5.3	36.8	0.97	0.83	0.97	20.2
8	T1	335	0.0	335	0.0	* 0.917	65.9	LOS E	11.5	80.7	0.99	1.00	1.23	26.2
9	R2	53	0.0	53	0.0	0.917	77.6	LOS F	11.5	80.7	1.00	1.10	1.38	25.6
Approach		419	0.0	419	0.0	0.917	66.8	LOS E	11.5	80.7	0.99	1.00	1.23	25.8
West: Carlingford Rd														
10	L2	22	0.0	22	0.0	0.900	66.1	LOS E	19.7	142.6	1.00	1.06	1.23	28.5
11	T1	820	4.1	820	4.1	* 0.900	60.4	LOS E	19.7	142.6	0.98	1.05	1.24	20.3
12	R2	265	1.6	265	1.6	* 0.735	39.4	LOS C	6.9	49.0	0.99	0.87	1.05	34.1
Approach		1107	3.4	1107	3.4	0.900	55.5	LOS D	19.7	142.6	0.99	1.00	1.19	24.2
All Vehicles		3027	2.8	3027	2.8	0.917	56.0	LOS D	19.7	142.6	0.98	0.97	1.16	29.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Midson Rd											
P1	Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	223.2	216.4	0.97
East: Carlingford Rd											
P2	Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	223.2	216.4	0.97
North: Midson Rd											
P3	Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	219.7	211.8	0.96

All Pedestrians	158	56.8	LOS E	0.2	0.2	0.95	0.95	222.1	214.9	0.97

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 101vv [6. Site Access AM (Site Folder: 2 - Post Development)]

Network: N101 [Sc. 2 AM - with POS mitigation (Network Folder: Scenario 2 Pdev)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson Street														
1	L2	122	0.9	122	0.9	0.349	8.0	LOS A	0.7	4.6	0.46	0.27	0.54	37.5
2	T1	234	2.7	234	2.7	0.349	2.9	LOS A	0.7	4.6	0.46	0.27	0.54	23.3
Approach		356	2.1	356	2.1	0.349	4.7	NA	0.7	4.6	0.46	0.27	0.54	34.1
North: Rawson Street														
8	T1	286	8.5	286	8.5	0.239	3.2	LOS A	0.5	3.6	0.38	0.10	0.40	30.5
9	R2	44	2.4	44	2.4	0.239	13.5	LOS A	0.5	3.6	0.38	0.10	0.40	37.9
Approach		331	7.6	331	7.6	0.239	4.6	NA	0.5	3.6	0.38	0.10	0.40	33.6
West: Site Acces														
10	L2	126	1.7	126	1.7	0.357	9.7	LOS A	0.5	3.8	0.67	0.90	0.85	32.5
12	R2	33	0.0	33	0.0	0.357	14.2	LOS A	0.5	3.8	0.67	0.90	0.85	32.5
Approach		159	1.3	159	1.3	0.357	10.6	LOS A	0.5	3.8	0.67	0.90	0.85	32.5
All Vehicles		845	4.1	845	4.1	0.357	5.8	NA	0.7	4.6	0.47	0.32	0.55	33.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 101v [XM. Rawson St PM - Pedestrian Operated Signals (Site Folder: 2 - Post Development)]

Network: N101 [Sc. 2 PM - with POS mitigation (Network Folder: Scenario 2 Pdev)]

New Site
Site Category: (None)
Pedestrian Crossing (Signalised) - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 40 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson Street														
2	T1	408	0.0	408	0.0	* 0.518	10.1	LOS A	3.8	26.8	0.80	0.69	0.80	28.1
Approach		408	0.0	408	0.0	0.518	10.1	LOS A	3.8	26.8	0.80	0.69	0.80	28.1
North: Rawson Street														
8	T1	285	5.5	285	5.5	0.375	9.4	LOS A	2.5	18.3	0.75	0.63	0.75	14.8
Approach		285	5.5	285	5.5	0.375	9.4	LOS A	2.5	18.3	0.75	0.63	0.75	14.8
All Vehicles		694	2.3	694	2.3	0.518	9.8	LOS A	3.8	26.8	0.78	0.66	0.78	24.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Rawson Street											
P1	Full	1047	15.1	LOS B	1.1	1.1	0.89	0.89	175.9	209.0	1.19
All Pedestrians		1047	15.1	LOS B	1.1	1.1	0.89	0.89	175.9	209.0	1.19

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 706 [1. Beecroft Rd/ Carlingford Rd PM (Site Folder: 2 - Post Development)]

Network: N101 [Sc. 2 PM - with POS mitigation (Network Folder: Scenario 2 Pdev)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Beecroft Road														
1	L2	899	4.4	899	4.4	0.606	13.1	LOS A	7.9	57.2	0.48	0.73	0.48	39.4
2	T1	1281	1.5	1281	1.5	* 0.983	75.9	LOS F	39.1	277.1	0.94	1.12	1.29	25.0
Approach		2180	2.7	2180	2.7	0.983	50.0	LOS D	39.1	277.1	0.75	0.96	0.96	27.5
North: Beecroft Road														
8	T1	751	1.6	751	1.6	0.195	14.2	LOS A	4.6	32.5	0.52	0.44	0.52	41.1
9	R2	304	5.5	304	5.5	* 0.996	118.2	LOS F	8.7	63.7	1.00	1.14	1.77	12.4
Approach		1055	2.7	1055	2.7	0.996	44.2	LOS D	8.7	63.7	0.66	0.64	0.88	24.7
West: Carlingford Road														
10	L2	96	4.4	96	4.4	0.924	74.1	LOS F	7.0	50.0	1.00	1.11	1.24	18.8
12	R2	1043	1.4	1043	1.4	* 0.924	68.8	LOS E	7.1	50.0	1.00	1.04	1.22	3.5
Approach		1139	1.7	1139	1.7	0.924	69.3	LOS E	7.1	50.0	1.00	1.05	1.22	5.3
All Vehicles		4374	2.4	4374	2.4	0.996	53.6	LOS D	39.1	277.1	0.79	0.91	1.01	21.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Beecroft Road											
P1B	Slip/ Bypass	53	59.3	LOS E	0.2	0.2	0.96	0.96	81.8	27.0	0.33
West: Carlingford Road											
P4	Full	7	59.2	LOS E	0.0	0.0	0.95	0.95	88.3	35.0	0.40
All Pedestrians		60	59.3	LOS E	0.2	0.2	0.96	0.96	82.6	28.0	0.34

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 1015 [2. Carlingford Rd/ Ray Rd/ Rawson St PM (Site Folder: 2 - Post Development)]

Network: N101 [Sc. 2 PM - with POS mitigation (Network Folder: Scenario 2 Pdev)]

NRT 6AM - 10AM, 3PM - 7PM
N Leg Parking Restrictions AM
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson St														
1	L2	118	0.9	118	0.9	0.374	39.3	LOS C	7.1	49.6	0.81	0.73	0.81	8.5
2	T1	144	0.0	144	0.0	* 0.832	39.0	LOS C	7.1	49.6	0.83	0.77	0.88	25.6
3	R2	135	0.0	135	0.0	0.832	68.9	LOS E	6.9	48.1	1.00	1.00	1.30	5.0
Approach		397	0.3	397	0.3	0.832	49.2	LOS D	7.1	49.6	0.88	0.84	1.00	14.8
East: Carlingford Rd														
4	L2	122	8.6	122	8.6	0.619	27.0	LOS B	6.9	50.0	0.80	0.74	0.80	8.5
5	T1	1072	3.9	1072	3.9	0.619	24.4	LOS B	6.9	50.0	0.81	0.74	0.81	8.2
6	R2	4	100.0	4	100.0	0.619	29.5	LOS C	6.9	50.0	0.83	0.75	0.83	30.0
Approach		1198	4.7	1198	4.7	0.619	24.7	LOS B	6.9	50.0	0.81	0.74	0.81	8.4
North: Ray Rd														
7	L2	137	0.8	137	0.8	0.442	41.3	LOS C	4.8	33.7	0.83	0.79	0.83	23.7
8	T1	105	4.0	105	4.0	0.220	34.3	LOS C	3.4	24.7	0.77	0.64	0.77	25.8
9	R2	16	6.7	16	6.7	0.220	38.9	LOS C	3.4	24.7	0.77	0.64	0.77	25.8
Approach		258	2.4	258	2.4	0.442	38.3	LOS C	4.8	33.7	0.80	0.72	0.80	24.6
West: Carlingford Rd														
10	L2	23	0.0	23	0.0	* 0.825	41.2	LOS C	16.0	114.1	0.90	0.90	1.00	39.6
11	T1	807	2.2	807	2.2	0.825	36.5	LOS C	16.0	114.1	0.90	0.91	1.01	35.3
12	R2	2	100.0	2	100.0	0.825	43.6	LOS D	15.0	107.5	0.90	0.91	1.02	35.1
Approach		833	2.4	833	2.4	0.825	36.6	LOS C	16.0	114.1	0.90	0.91	1.01	35.5
All Vehicles		2685	3.1	2685	3.1	0.832	33.3	LOS C	16.0	114.1	0.85	0.81	0.90	24.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Rawson St											
P1	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	87.8	34.2	0.39
East: Carlingford Rd											
P2	Full	105	59.4	LOS E	0.4	0.4	0.96	0.96	88.4	34.8	0.39

North: Ray Rd										
P3	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	87.1	33.4	0.38
West: Carlingford Rd										
P4	Full	211	59.7	LOS E	0.7	0.7	0.96	0.96	88.7	34.8	0.39
All Pedestrians		421	59.5	LOS E	0.7	0.7	0.96	0.96	88.3	34.6	0.39

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 3 [3. Rawson St/ Bridge St PM (Site Folder: 2 - Post Development)]

Network: N101 [Sc. 2 PM - with POS mitigation (Network Folder: Scenario 2 Pdev)]

Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson Street														
1	L2	28	0.0	28	0.0	0.448	13.5	LOS A	1.2	8.3	0.82	0.97	0.95	41.4
2	T1	83	0.0	83	0.0	0.448	13.3	LOS A	1.2	8.3	0.82	0.97	0.95	36.0
3	R2	60	0.0	60	0.0	0.448	17.2	LOS B	1.2	8.3	0.82	0.97	0.95	26.9
3u	U	6	0.0	6	0.0	0.448	20.1	LOS B	1.2	8.3	0.82	0.97	0.95	44.8
Approach		178	0.0	178	0.0	0.448	14.9	LOS B	1.2	8.3	0.82	0.97	0.95	33.8
East: Bridge Street														
4	L2	42	0.0	42	0.0	0.740	13.6	LOS A	3.9	27.0	0.89	0.94	1.13	37.1
5	T1	281	0.4	281	0.4	0.740	13.4	LOS A	3.9	27.0	0.89	0.94	1.13	38.0
6	R2	147	0.0	147	0.0	0.740	17.0	LOS B	3.9	27.0	0.89	0.94	1.13	18.2
6u	U	2	0.0	2	0.0	0.740	18.6	LOS B	3.9	27.0	0.89	0.94	1.13	11.9
Approach		473	0.2	473	0.2	0.740	14.6	LOS B	3.9	27.0	0.89	0.94	1.13	34.8
North: Rawson Street														
7	L2	47	17.8	47	17.8	0.384	5.9	LOS A	0.9	6.3	0.37	0.59	0.37	35.7
8	T1	111	1.0	111	1.0	0.384	5.3	LOS A	0.9	6.3	0.37	0.59	0.37	44.3
9	R2	109	5.8	109	5.8	0.384	9.0	LOS A	0.9	6.3	0.37	0.59	0.37	44.4
9u	U	18	0.0	18	0.0	0.384	10.4	LOS A	0.9	6.3	0.37	0.59	0.37	33.5
Approach		285	5.5	285	5.5	0.384	7.2	LOS A	0.9	6.3	0.37	0.59	0.37	43.2
West: Bridge Street														
10	L2	160	0.0	160	0.0	0.395	7.9	LOS A	0.9	6.5	0.67	0.76	0.67	40.8
11	T1	36	2.9	36	2.9	0.395	8.2	LOS A	0.9	6.5	0.67	0.76	0.67	42.4
12	R2	14	0.0	14	0.0	0.395	11.7	LOS A	0.9	6.5	0.67	0.76	0.67	45.1
12u	U	9	0.0	9	0.0	0.395	13.3	LOS A	0.9	6.5	0.67	0.76	0.67	45.7
Approach		219	0.5	219	0.5	0.395	8.4	LOS A	0.9	6.5	0.67	0.76	0.67	41.8
All Vehicles		1155	1.5	1155	1.5	0.740	11.6	LOS A	3.9	27.0	0.71	0.82	0.82	37.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 216 [4. Blaxland Rd/ Epping Rd - PM (Site Folder: 2 - Post Development)]

Network: N101 [Sc. 2 PM - with POS mitigation (Network Folder: Scenario 2 Pdev)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Blaxland Rd														
21a	L1	964	0.9	964	0.9	* 0.976	92.1	LOS F	30.8	217.0	1.00	1.11	1.47	15.0
22	T1	105	3.0	105	3.0	0.508	58.1	LOS E	3.9	28.0	0.97	0.78	0.97	29.2
Approach		1069	1.1	1069	1.1	0.976	88.7	LOS F	30.8	217.0	0.99	1.08	1.42	16.4
East: Epping Rd														
4b	L3	13	0.0	13	0.0	0.019	30.6	LOS C	0.3	2.0	0.62	0.68	0.62	39.5
5	T1	1574	2.5	1574	2.5	* 0.945	59.7	LOS E	40.3	289.0	1.00	1.11	1.24	20.4
Approach		1586	2.5	1586	2.5	0.945	59.4	LOS E	40.3	289.0	1.00	1.11	1.24	20.6
NorthWest: Langston Pl														
27a	L1	25	4.2	25	4.2	0.446	64.0	LOS E	3.3	24.0	0.98	0.77	0.98	28.0
28	T1	186	2.8	186	2.8	0.446	57.2	LOS E	4.5	31.8	0.97	0.77	0.97	29.5
Approach		212	3.0	212	3.0	0.446	58.0	LOS E	4.5	31.8	0.97	0.77	0.97	29.3
West: Epping Rd														
10b	L3	424	1.2	424	1.2	0.532	8.5	LOS A	2.6	18.6	0.15	0.50	0.15	50.1
11	T1	1088	2.0	1088	2.0	0.532	2.6	LOS A	5.4	38.1	0.18	0.25	0.18	56.3
12a	R1	317	0.7	317	0.7	0.994	84.4	LOS F	12.4	87.2	1.00	1.18	1.51	23.5
Approach		1828	1.6	1828	1.6	0.994	18.2	LOS B	12.4	87.2	0.32	0.47	0.40	44.3
All Vehicles		4696	1.8	4696	1.8	0.994	50.0	LOS D	40.3	289.0	0.73	0.84	0.94	27.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: Blaxland Rd											
P5	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	226.5	217.4	0.96
East: Epping Rd											
P2	Full	168	59.6	LOS E	0.6	0.6	0.96	0.96	227.6	218.4	0.96
NorthWest: Langston Pl											
P7	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	222.7	212.5	0.95
All Pedestrians		274	59.4	LOS E	0.6	0.6	0.96	0.96	226.4	217.1	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 1068 [5. Midson Rd/ Carlingford Rd - PM (Site Folder: 2 - Post Development)]

Network: N101 [Sc. 2 PM - with POS mitigation (Network Folder: Scenario 2 Pdev)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Midson Rd														
1	L2	109	2.9	109	2.9	0.565	42.7	LOS D	7.9	56.2	0.92	0.80	0.92	33.6
2	T1	407	0.3	407	0.3	* 0.942	55.5	LOS D	17.4	123.6	0.97	1.01	1.22	28.1
3	R2	176	4.2	176	4.2	0.942	72.3	LOS F	17.4	123.6	1.00	1.15	1.42	17.5
Approach		693	1.7	693	1.7	0.942	57.7	LOS E	17.4	123.6	0.97	1.01	1.22	26.5
East: Carlingford Rd														
4	L2	74	1.4	74	1.4	0.972	82.5	LOS F	23.7	171.2	1.00	1.25	1.50	29.7
5	T1	909	4.3	909	4.3	* 0.972	76.7	LOS F	23.7	171.2	1.00	1.25	1.51	31.0
6	R2	185	0.0	185	0.0	* 0.537	28.7	LOS C	3.8	26.9	0.89	0.80	0.89	41.9
Approach		1168	3.4	1168	3.4	0.972	69.5	LOS E	23.7	171.2	0.98	1.18	1.41	32.3
North: Midson Rd														
7	L2	39	2.7	39	2.7	0.557	50.9	LOS D	3.7	26.4	0.99	0.83	0.99	21.9
8	T1	262	1.6	262	1.6	* 0.929	61.5	LOS E	8.8	62.5	1.00	1.03	1.32	27.0
9	R2	49	0.0	49	0.0	0.929	74.1	LOS F	8.8	62.5	1.00	1.13	1.50	26.2
Approach		351	1.5	351	1.5	0.929	62.1	LOS E	8.8	62.5	0.99	1.02	1.31	26.5
West: Carlingford Rd														
10	L2	42	0.0	42	0.0	0.596	41.0	LOS C	9.3	66.2	0.91	0.79	0.91	35.2
11	T1	623	2.5	623	2.5	0.596	35.5	LOS C	9.5	67.6	0.91	0.78	0.91	27.9
12	R2	207	0.5	207	0.5	0.791	39.9	LOS C	5.0	35.0	1.00	0.88	1.17	34.0
Approach		873	1.9	873	1.9	0.791	36.8	LOS C	9.5	67.6	0.93	0.81	0.97	30.3
All Vehicles		3084	2.4	3084	2.4	0.972	56.8	LOS E	23.7	171.2	0.97	1.02	1.23	29.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Midson Rd											
P1	Full	53	49.3	LOS E	0.2	0.2	0.95	0.95	215.7	216.4	1.00
East: Carlingford Rd											
P2	Full	53	49.3	LOS E	0.2	0.2	0.95	0.95	215.7	216.4	1.00
North: Midson Rd											
P3	Full	53	49.3	LOS E	0.2	0.2	0.95	0.95	212.2	211.8	1.00

All Pedestrians	158	49.3	LOS E	0.2	0.2	0.95	0.95	214.6	214.9	1.00

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 101vv [6. Site Access PM (Site Folder: 2 - Post Development)]

Network: N101 [Sc. 2 PM - with POS mitigation (Network Folder: Scenario 2 Pdev)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson Street														
1	L2	202	0.0	202	0.0	0.387	9.4	LOS A	1.0	6.9	0.66	0.51	0.82	35.6
2	T1	160	3.9	160	3.9	0.387	5.2	LOS A	1.0	6.9	0.66	0.51	0.82	17.8
Approach		362	1.7	362	1.7	0.387	7.6	NA	1.0	6.9	0.66	0.51	0.82	33.1
North: Rawson Street														
8	T1	144	17.5	144	17.5	0.286	9.5	LOS A	0.8	6.2	0.78	0.40	0.90	18.7
9	R2	88	0.0	88	0.0	0.286	16.1	LOS B	0.8	6.2	0.78	0.40	0.90	33.5
Approach		233	10.9	233	10.9	0.286	12.0	NA	0.8	6.2	0.78	0.40	0.90	28.6
West: Site Acces														
10	L2	249	0.0	249	0.0	0.513	12.8	LOS A	1.4	9.5	0.77	1.08	1.24	31.0
12	R2	48	0.0	48	0.0	0.513	16.6	LOS B	1.4	9.5	0.77	1.08	1.24	31.0
Approach		298	0.0	298	0.0	0.513	13.4	LOS A	1.4	9.5	0.77	1.08	1.24	31.0
All Vehicles		893	3.5	893	3.5	0.513	10.7	NA	1.4	9.5	0.73	0.67	0.98	31.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 1068 [5. Midson Rd/ Carlingford Rd - AM (Site Folder: 3 - Background Growth without Development)] **Network: N101 [Sc. 3 AM BG wo dev (Network Folder: Scenario 3 Background Growth)]**

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 125 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Midson Rd														
1	L2	55	1.9	55	1.9	0.493	50.4	LOS D	6.9	48.6	0.92	0.78	0.92	31.5
2	T1	299	0.4	299	0.4	* 0.822	50.7	LOS D	12.6	89.8	0.96	0.86	1.03	29.1
3	R2	182	4.0	182	4.0	0.822	60.6	LOS E	12.6	89.8	1.00	0.94	1.14	19.5
Approach		536	1.8	536	1.8	0.822	54.0	LOS D	12.6	89.8	0.97	0.88	1.05	26.6
East: Carlingford Rd														
4	L2	44	4.8	44	4.8	0.890	64.9	LOS E	18.5	133.9	1.00	1.04	1.22	33.2
5	T1	799	4.0	799	4.0	0.890	58.9	LOS E	18.5	133.9	0.99	1.04	1.22	35.0
6	R2	142	2.2	142	2.2	0.430	32.7	LOS C	3.1	22.0	0.93	0.79	0.93	40.5
Approach		985	3.7	985	3.7	0.890	55.4	LOS D	18.5	133.9	0.98	1.00	1.18	35.6
North: Midson Rd														
7	L2	32	0.0	32	0.0	0.523	57.4	LOS E	5.2	36.4	0.96	0.83	0.96	20.5
8	T1	335	0.0	335	0.0	* 0.871	60.7	LOS E	10.8	75.7	0.99	0.95	1.15	27.2
9	R2	53	0.0	53	0.0	0.871	69.9	LOS E	10.8	75.7	1.00	1.03	1.26	27.1
Approach		419	0.0	419	0.0	0.871	61.6	LOS E	10.8	75.7	0.99	0.95	1.15	26.8
West: Carlingford Rd														
10	L2	22	0.0	22	0.0	0.909	68.0	LOS E	20.3	146.7	1.00	1.07	1.25	28.1
11	T1	835	4.0	835	4.0	* 0.909	62.4	LOS E	20.3	146.7	0.99	1.07	1.26	19.9
12	R2	244	1.7	244	1.7	* 0.711	38.2	LOS C	6.2	43.8	0.99	0.86	1.03	34.5
Approach		1101	3.4	1101	3.4	0.909	57.1	LOS E	20.3	146.7	0.99	1.02	1.21	23.7
All Vehicles		3041	2.8	3041	2.8	0.909	56.6	LOS E	20.3	146.7	0.98	0.98	1.16	29.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Midson Rd											
P1	Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	223.2	216.4	0.97
East: Carlingford Rd											
P2	Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	223.2	216.4	0.97
North: Midson Rd											

P3 Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	219.7	211.8	0.96
All Pedestrians	158	56.8	LOS E	0.2	0.2	0.95	0.95	222.1	214.9	0.97

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 706 [1. Beecroft Rd/ Carlingford Rd AM (Site Folder: 3 - Background Growth without Development)]

Network: N101 [Sc. 3 AM BG wo dev (Network Folder: Scenario 3 Background Growth)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Beecroft Road														
1	L2	758	4.5	758	4.5	0.519	10.8	LOS A	5.5	40.2	0.37	0.68	0.37	42.0
2	T1	1070	2.7	1070	2.7	* 0.994	65.7	LOS E	30.2	216.1	0.94	1.10	1.29	27.2
Approach		1828	3.5	1828	3.5	0.994	43.0	LOS D	30.2	216.1	0.70	0.93	0.91	29.7
North: Beecroft Road														
8	T1	1354	0.9	1354	0.9	0.647	24.8	LOS B	12.2	86.0	0.74	0.65	0.74	33.3
9	R2	214	6.4	214	6.4	* 0.998	122.6	LOS F	6.2	45.7	1.00	1.16	1.86	12.1
Approach		1567	1.7	1567	1.7	0.998	38.1	LOS C	12.2	86.0	0.77	0.72	0.89	26.9
West: Carlingford Road														
10	L2	69	12.1	69	12.1	0.977	76.7	LOS F	6.9	50.0	1.00	1.13	1.31	18.3
12	R2	1415	3.1	1415	3.1	* 0.977	72.5	LOS F	7.0	50.0	1.00	1.09	1.31	3.3
Approach		1485	3.6	1485	3.6	0.977	72.7	LOS F	7.0	50.0	1.00	1.09	1.31	4.3
All Vehicles		4880	2.9	4880	2.9	0.998	50.4	LOS D	30.2	216.1	0.82	0.91	1.02	21.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Beecroft Road											
P1B	Slip/ Bypass	53	59.3	LOS E	0.2	0.2	0.96	0.96	81.8	27.0	0.33
West: Carlingford Road											
P4	Full	7	59.2	LOS E	0.0	0.0	0.95	0.95	88.3	35.0	0.40
All Pedestrians		60	59.3	LOS E	0.2	0.2	0.96	0.96	82.6	28.0	0.34

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 1015 [2. Carlingford Rd/ Ray Rd/ Rawson St AM (Site Folder: 3 - Background Growth without Development)]

Network: N101 [Sc. 3 AM BG wo dev (Network Folder: Scenario 3 Background Growth)]

NRT 6AM - 10AM, 3PM - 7PM
N Leg Parking Restrictions AM
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson St														
1	L2	99	1.1	99	1.1	0.355	41.1	LOS C	7.0	49.1	0.82	0.73	0.82	11.8
2	T1	136	0.8	136	0.8	0.355	36.6	LOS C	7.0	49.1	0.82	0.73	0.82	27.7
3	R2	82	5.1	82	5.1	1.251	305.1	LOS F	8.0	58.8	1.00	1.53	2.88	1.8
Approach		317	2.0	317	2.0	1.251	107.6	LOS F	8.0	58.8	0.87	0.94	1.35	9.9
East: Carlingford Rd														
4	L2	154	11.0	154	11.0	0.493	22.9	LOS B	6.8	50.0	0.70	0.68	0.70	21.8
5	T1	808	3.4	808	3.4	0.493	21.9	LOS B	6.9	50.0	0.75	0.69	0.75	9.0
6	R2	4	100.0	4	100.0	0.493	28.0	LOS B	6.9	50.0	0.78	0.70	0.78	30.8
Approach		966	5.0	966	5.0	0.493	22.1	LOS B	6.9	50.0	0.74	0.69	0.74	11.8
North: Ray Rd														
7	L2	256	1.2	256	1.2	* 0.890	72.6	LOS F	12.0	84.9	1.00	1.03	1.34	16.9
8	T1	198	3.2	198	3.2	0.444	39.6	LOS C	7.2	52.0	0.86	0.74	0.86	27.2
9	R2	33	3.2	33	3.2	0.444	44.1	LOS D	7.2	52.0	0.86	0.74	0.86	24.0
Approach		486	2.2	486	2.2	0.890	57.2	LOS E	12.0	84.9	0.93	0.89	1.11	21.0
West: Carlingford Rd														
10	L2	20	0.0	20	0.0	0.898	52.1	LOS D	25.2	181.3	0.96	1.03	1.15	36.4
11	T1	1105	3.4	1105	3.4	* 0.898	47.2	LOS D	25.2	181.3	0.96	1.04	1.16	31.6
12	R2	2	100.0	2	100.0	0.898	54.3	LOS D	23.9	173.0	0.96	1.04	1.16	32.3
Approach		1128	3.5	1128	3.5	0.898	47.3	LOS D	25.2	181.3	0.96	1.04	1.16	31.7
All Vehicles		2897	3.6	2897	3.6	1.251	47.2	LOS D	25.2	181.3	0.87	0.88	1.03	23.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Rawson St											
P1	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	87.8	34.2	0.39
East: Carlingford Rd											

P2 Full	168	59.6	LOS E	0.6	0.6	0.96	0.96	88.6	34.8	0.39
North: Ray Rd										
P3 Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	87.1	33.4	0.38
West: Carlingford Rd										
P4 Full	316	59.9	LOS E	1.1	1.1	0.97	0.97	88.9	34.8	0.39
All Pedestrians	589	59.7	LOS E	1.1	1.1	0.96	0.96	88.6	34.6	0.39

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 216 [4. Blaxland Rd/ Epping Rd - AM (Site Folder: 3 - Background Growth without Development)]

Network: N101 [Sc. 3 AM BG wo dev (Network Folder: Scenario 3 Background Growth)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Blaxland Rd														
21a	L1	588	4.3	588	4.3	0.324	24.5	LOS B	6.7	48.7	0.63	0.75	0.63	33.4
22	T1	189	3.3	189	3.3	0.697	60.1	LOS E	7.3	52.3	1.00	0.85	1.05	28.8
Approach		777	4.1	777	4.1	0.697	33.2	LOS C	7.3	52.3	0.72	0.77	0.73	31.4
East: Epping Rd														
4b	L3	20	5.3	20	5.3	0.041	40.0	LOS C	0.5	3.9	0.73	0.70	0.73	35.9
5	T1	1247	3.2	1247	3.2	* 0.863	46.3	LOS D	24.5	174.9	0.99	0.97	1.09	24.0
Approach		1267	3.3	1267	3.3	0.863	46.2	LOS D	24.5	175.8	0.99	0.96	1.08	24.2
NorthWest: Langston Pl														
27a	L1	44	9.5	44	9.5	0.581	66.3	LOS E	3.9	28.7	1.00	0.79	1.00	27.4
28	T1	273	1.5	273	1.5	* 0.775	61.9	LOS E	8.5	60.6	1.00	0.88	1.09	28.4
Approach		317	2.7	317	2.7	0.775	62.5	LOS E	8.5	60.6	1.00	0.87	1.08	28.3
West: Epping Rd														
10b	L3	329	3.8	329	3.8	0.815	13.3	LOS A	13.9	99.7	0.48	0.61	0.48	47.8
11	T1	1873	1.8	1873	1.8	0.815	6.8	LOS A	23.2	164.4	0.50	0.52	0.50	52.7
12a	R1	535	1.5	535	1.5	* 0.978	70.2	LOS E	18.9	134.3	1.00	1.15	1.36	26.2
Approach		2737	2.0	2737	2.0	0.978	20.0	LOS B	23.2	164.4	0.59	0.65	0.66	43.5
All Vehicles		5099	2.7	5099	2.7	0.978	31.1	LOS C	24.5	175.8	0.74	0.76	0.80	35.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: Blaxland Rd											
P5	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	226.5	217.4	0.96
East: Epping Rd											
P2	Full	242	59.7	LOS E	0.9	0.9	0.96	0.96	227.7	218.4	0.96
NorthWest: Langston Pl											
P7	Full	232	59.7	LOS E	0.8	0.8	0.96	0.96	223.2	212.5	0.95
All Pedestrians		526	59.7	LOS E	0.9	0.9	0.96	0.96	225.6	215.7	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 1068 [5. Midson Rd/ Carlingford Rd - PM (Site Folder: 3 - Background Growth without Development)]

Network: N101 [Sc. 3 PM BG wo dev (Network Folder: Scenario 3 Background Growth)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Midson Rd														
1	L2	118	2.7	118	2.7	0.577	42.8	LOS D	8.1	57.6	0.92	0.80	0.92	33.5
2	T1	408	0.3	408	0.3	* 0.961	59.6	LOS E	18.4	130.9	0.97	1.04	1.26	27.2
3	R2	177	4.2	177	4.2	0.961	78.8	LOS F	18.4	130.9	1.00	1.20	1.49	16.5
Approach		703	1.6	703	1.6	0.961	61.6	LOS E	18.4	130.9	0.97	1.04	1.26	25.7
East: Carlingford Rd														
4	L2	65	1.6	65	1.6	0.950	73.7	LOS F	21.8	157.6	1.00	1.19	1.41	31.3
5	T1	899	4.3	896	4.3	* 0.950	68.0	LOS E	21.8	157.6	1.00	1.19	1.43	32.8
6	R2	184	0.0	184	0.0	0.547	29.0	LOS C	3.8	26.6	0.90	0.80	0.90	41.8
Approach		1148	3.5	1145 N1	3.5	0.950	62.0	LOS E	21.8	157.6	0.98	1.13	1.34	33.9
North: Midson Rd														
7	L2	39	2.7	39	2.7	0.556	50.8	LOS D	3.7	26.3	0.99	0.83	0.99	21.9
8	T1	261	1.6	261	1.6	* 0.926	61.1	LOS E	8.8	62.0	0.99	1.02	1.31	27.0
9	R2	49	0.0	49	0.0	0.926	73.5	LOS F	8.8	62.0	1.00	1.13	1.49	26.3
Approach		349	1.5	349	1.5	0.926	61.7	LOS E	8.8	62.0	0.99	1.02	1.30	26.6
West: Carlingford Rd														
10	L2	42	0.0	42	0.0	0.623	41.4	LOS C	9.8	70.1	0.92	0.80	0.92	35.1
11	T1	655	2.4	655	2.4	0.623	35.9	LOS C	10.0	71.5	0.92	0.79	0.92	27.7
12	R2	213	0.5	213	0.5	* 0.800	39.6	LOS C	5.1	35.8	1.00	0.89	1.18	34.1
Approach		909	1.9	909	1.9	0.800	37.0	LOS C	10.0	71.5	0.94	0.82	0.98	30.2
All Vehicles		3111	2.4	3107 N1	2.4	0.961	54.6	LOS D	21.8	157.6	0.97	1.00	1.21	30.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Midson Rd											
P1	Full	53	49.3	LOS E	0.2	0.2	0.95	0.95	215.7	216.4	1.00
East: Carlingford Rd											
P2	Full	53	49.3	LOS E	0.2	0.2	0.95	0.95	215.7	216.4	1.00

North: Midson Rd										
P3 Full	53	49.3	LOS E	0.2	0.2	0.95	0.95	212.2	211.8	1.00
All Pedestrians	158	49.3	LOS E	0.2	0.2	0.95	0.95	214.6	214.9	1.00

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 706 [1. Beecroft Rd/ Carlingford Rd PM (Site Folder: 3 - Background Growth without Development)]

Network: N101 [Sc. 3 PM BG wo dev (Network Folder: Scenario 3 Background Growth)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Beecroft Road														
1	L2	936	4.3	933	4.3	0.628	13.3	LOS A	8.3	60.5	0.50	0.73	0.50	39.2
2	T1	1317	1.4	1313	1.4	* 1.008	99.1	LOS F	45.3	320.7	1.00	1.30	1.52	21.2
Approach		2253	2.6	2245 N1	2.6	1.008	63.5	LOS E	45.3	320.7	0.79	1.07	1.09	23.9
North: Beecroft Road														
8	T1	757	1.6	757	1.6	0.196	14.2	LOS A	4.6	32.8	0.52	0.44	0.52	41.1
9	R2	300	5.6	300	5.6	* 0.978	109.3	LOS F	8.2	60.2	1.00	1.11	1.71	13.2
Approach		1057	2.7	1057	2.7	0.978	41.2	LOS C	8.2	60.2	0.65	0.63	0.86	25.7
West: Carlingford Road														
10	L2	89	4.7	89	4.7	0.928	76.1	LOS F	7.0	50.0	1.00	1.12	1.25	18.5
12	R2	1051	1.4	1051	1.4	* 0.928	69.8	LOS E	7.1	50.0	1.00	1.05	1.23	3.4
Approach		1141	1.7	1141	1.7	0.928	70.3	LOS E	7.1	50.0	1.00	1.05	1.23	5.1
All Vehicles		4450	2.4	4443 N1	2.4	1.008	59.9	LOS E	45.3	320.7	0.81	0.96	1.07	20.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Beecroft Road											
P1B	Slip/ Bypass	53	59.3	LOS E	0.2	0.2	0.96	0.96	81.8	27.0	0.33
West: Carlingford Road											
P4	Full	7	59.2	LOS E	0.0	0.0	0.95	0.95	88.3	35.0	0.40
All Pedestrians		60	59.3	LOS E	0.2	0.2	0.96	0.96	82.6	28.0	0.34

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 1015 [2. Carlingford Rd/ Ray Rd/ Rawson St PM (Site Folder: 3 - Background Growth without Development)]

Network: N101 [Sc. 3 PM BG wo dev (Network Folder: Scenario 3 Background Growth)]

NRT 6AM - 10AM, 3PM - 7PM
N Leg Parking Restrictions AM
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson St														
1	L2	99	1.0	99	1.0	0.368	41.4	LOS C	6.6	46.6	0.82	0.73	0.82	11.8
2	T1	151	0.0	151	0.0	* 0.817	42.0	LOS C	6.6	46.6	0.86	0.78	0.91	26.0
3	R2	113	0.0	113	0.0	0.817	68.9	LOS E	6.2	43.1	1.00	0.99	1.28	7.4
Approach		363	0.3	363	0.3	0.817	50.2	LOS D	6.6	46.6	0.89	0.84	1.00	17.4
East: Carlingford Rd														
4	L2	160	6.6	159	6.6	0.609	24.6	LOS B	6.9	50.0	0.73	0.70	0.73	20.6
5	T1	1067	3.9	1062	3.9	0.609	21.8	LOS B	6.9	50.0	0.76	0.71	0.76	9.0
6	R2	4	100.0	4	100.0	0.609	26.6	LOS B	6.9	50.0	0.79	0.71	0.79	31.3
Approach		1232	4.6	1226 N1	4.6	0.609	22.2	LOS B	6.9	50.0	0.76	0.70	0.76	11.2
North: Ray Rd														
7	L2	145	0.7	145	0.7	0.504	44.5	LOS D	5.2	36.4	0.86	0.80	0.86	22.7
8	T1	112	3.7	112	3.7	0.277	38.8	LOS C	4.1	29.3	0.82	0.69	0.82	27.4
9	R2	22	4.8	22	4.8	0.277	43.4	LOS D	4.1	29.3	0.82	0.69	0.82	24.2
Approach		280	2.3	280	2.3	0.504	42.1	LOS C	5.2	36.4	0.84	0.75	0.84	24.8
West: Carlingford Rd														
10	L2	40	0.0	40	0.0	* 0.816	37.5	LOS C	16.0	114.0	0.87	0.87	0.96	40.7
11	T1	823	2.2	823	2.2	0.816	32.9	LOS C	16.0	114.0	0.88	0.87	0.97	36.8
12	R2	2	100.0	2	100.0	0.816	40.1	LOS C	14.9	106.4	0.88	0.88	0.98	37.1
Approach		865	2.3	865	2.3	0.816	33.1	LOS C	16.0	114.0	0.88	0.87	0.97	37.0
All Vehicles		2740	3.1	2734 N1	3.1	0.817	31.4	LOS C	16.0	114.0	0.82	0.78	0.87	26.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Rawson St											
P1	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	87.8	34.2	0.39

East: Carlingford Rd										
P2	Full	105	59.4	LOS E	0.4	0.4	0.96	0.96	88.4	34.8	0.39
North: Ray Rd										
P3	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	87.1	33.4	0.38
West: Carlingford Rd										
P4	Full	211	59.7	LOS E	0.7	0.7	0.96	0.96	88.7	34.8	0.39
All Pedestrians		421	59.5	LOS E	0.7	0.7	0.96	0.96	88.3	34.6	0.39

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 216 [4. Blaxland Rd/ Epping Rd - PM (Site Folder: 3 - Background Growth without Development)]

Network: N101 [Sc. 3 PM BG wo dev (Network Folder: Scenario 3 Background Growth)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Blaxland Rd														
21a	L1	968	0.9	968	0.9	* 1.026	122.7	LOS F	37.2	262.0	1.00	1.21	1.67	11.9
22	T1	114	2.8	114	2.8	0.548	58.5	LOS E	4.2	30.4	0.98	0.79	0.98	29.1
Approach		1082	1.1	1082	1.1	1.026	115.9	LOS F	37.2	262.0	1.00	1.16	1.60	13.4
East: Epping Rd														
4b	L3	13	0.0	13	0.0	0.019	30.6	LOS C	0.3	2.0	0.62	0.68	0.62	39.5
5	T1	1599	2.5	1599	2.5	* 1.011	96.4	LOS F	54.1	387.7	1.00	1.32	1.50	14.5
Approach		1612	2.4	1612	2.4	1.011	95.9	LOS F	54.1	387.7	1.00	1.31	1.49	14.6
NorthWest: Langston Pl														
27a	L1	32	3.3	32	3.3	0.477	64.4	LOS E	3.4	24.4	0.98	0.77	0.98	27.9
28	T1	189	2.8	189	2.8	0.477	57.4	LOS E	4.8	34.2	0.97	0.77	0.97	29.4
Approach		221	2.9	221	2.9	0.477	58.4	LOS E	4.8	34.2	0.97	0.77	0.97	29.2
West: Epping Rd														
10b	L3	444	1.2	444	1.2	0.533	8.6	LOS A	2.8	20.1	0.17	0.51	0.17	49.9
11	T1	1082	2.0	1082	2.0	0.533	2.7	LOS A	5.5	38.6	0.18	0.25	0.18	56.2
12a	R1	316	0.7	316	0.7	0.991	82.7	LOS F	12.2	86.0	1.00	1.17	1.50	23.8
Approach		1842	1.6	1842	1.6	0.991	17.9	LOS B	12.2	86.0	0.32	0.47	0.40	44.5
All Vehicles		4757	1.8	4757	1.8	1.026	68.5	LOS E	54.1	387.7	0.73	0.93	1.07	22.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: Blaxland Rd											
P5	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	226.5	217.4	0.96
East: Epping Rd											
P2	Full	168	59.6	LOS E	0.6	0.6	0.96	0.96	227.6	218.4	0.96
NorthWest: Langston Pl											
P7	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	222.7	212.5	0.95
All Pedestrians		274	59.4	LOS E	0.6	0.6	0.96	0.96	226.4	217.1	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 101v [XM. Rawson St AM - Pedestrian Operated Signals (Site Folder: 4 - Background Growth with Development)]

Network: N101 [Sc. 4 AM - with POS mitigation (Network Folder: Scenario 4 BG & Pdev)]

New Site
Site Category: (None)
Pedestrian Crossing (Signalised) - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 40 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson Street														
2	T1	532	1.0	532	1.0	* 0.639	10.3	LOS A	5.2	37.0	0.84	0.74	0.85	27.9
Approach		532	1.0	532	1.0	0.639	10.3	LOS A	5.2	37.0	0.84	0.74	0.85	27.9
North: Rawson Street														
8	T1	452	5.1	452	5.1	0.557	9.7	LOS A	4.2	30.8	0.80	0.69	0.80	14.5
Approach		452	5.1	452	5.1	0.557	9.7	LOS A	4.2	30.8	0.80	0.69	0.80	14.5
All Vehicles		983	2.9	983	2.9	0.639	10.0	LOS A	5.2	37.0	0.82	0.72	0.83	23.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Rawson Street											
P1	Full	858	15.0	LOS B	0.9	0.9	0.88	0.88	175.8	209.0	1.19
All Pedestrians		858	15.0	LOS B	0.9	0.9	0.88	0.88	175.8	209.0	1.19

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 706 [1. Beecroft Rd/ Carlingford Rd AM (Site Folder: 4 - Background Growth with Development)]

Network: N101 [Sc. 4 AM - with POS mitigation (Network Folder: Scenario 4 BG & Pdev)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Beecroft Road														
1	L2	763	4.5	763	4.5	0.528	11.6	LOS A	5.6	41.0	0.41	0.70	0.41	41.0
2	T1	1070	2.7	1070	2.7	* 1.006	79.1	LOS F	31.7	227.1	0.99	1.18	1.39	24.4
Approach		1833	3.5	1833	3.5	1.006	51.0	LOS D	31.7	227.1	0.75	0.98	0.98	27.1
North: Beecroft Road														
8	T1	1354	0.9	1354	0.9	0.639	24.1	LOS B	12.1	85.5	0.73	0.64	0.73	33.8
9	R2	227	6.0	227	6.0	* 0.997	122.0	LOS F	6.6	48.5	1.00	1.16	1.85	12.1
Approach		1581	1.6	1581	1.6	0.997	38.1	LOS C	12.1	85.5	0.77	0.72	0.89	26.9
West: Carlingford Road														
10	L2	78	10.8	75	10.7	0.980	83.4	LOS F	6.9	50.0	1.00	1.14	1.32	17.3
12	R2	1445	3.1	1391	3.1	* 0.980	78.8	LOS F	7.0	50.0	1.00	1.10	1.32	3.1
Approach		1523	3.5	1466 N1	3.5	0.980	79.0	LOS F	7.0	50.0	1.00	1.10	1.32	4.1
All Vehicles		4937	2.9	4879 N1	2.9	1.006	55.2	LOS D	31.7	227.1	0.83	0.93	1.05	20.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Beecroft Road											
P1B	Slip/ Bypass	53	59.3	LOS E	0.2	0.2	0.96	0.96	81.8	27.0	0.33
West: Carlingford Road											
P4	Full	7	59.2	LOS E	0.0	0.0	0.95	0.95	88.3	35.0	0.40
All Pedestrians		60	59.3	LOS E	0.2	0.2	0.96	0.96	82.6	28.0	0.34

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 1015 [2. Carlingford Rd/ Ray Rd/ Rawson St AM (Site Folder: 4 - Background Growth with Development)]

Network: N101 [Sc. 4 AM - with POS mitigation (Network Folder: Scenario 4 BG & Pdev)]

NRT 6AM - 10AM, 3PM - 7PM
N Leg Parking Restrictions AM
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson St														
1	L2	127	0.8	127	0.8	0.411	41.9	LOS C	8.2	58.0	0.84	0.75	0.84	8.1
2	T1	144	0.7	144	0.7	0.411	37.3	LOS C	8.2	58.0	0.84	0.75	0.84	26.2
3	R2	125	3.4	125	3.4	1.895	862.0	LOS F	12.5	90.0	1.00	2.18	4.50	0.4
Approach		397	1.6	397	1.6	1.895	299.1	LOS F	12.5	90.0	0.89	1.20	1.99	3.1
East: Carlingford Rd														
4	L2	174	9.7	174	9.7	0.503	22.9	LOS B	6.8	50.0	0.67	0.66	0.67	9.8
5	T1	807	3.4	807	3.4	0.503	21.8	LOS B	6.9	50.0	0.73	0.68	0.73	9.0
6	R2	4	100.0	4	100.0	0.503	27.7	LOS B	6.9	50.0	0.78	0.69	0.78	30.9
Approach		985	4.9	985	4.9	0.503	22.0	LOS B	6.9	50.0	0.72	0.68	0.72	9.3
North: Ray Rd														
7	L2	256	1.2	256	1.2	* 0.890	72.6	LOS F	12.0	84.9	1.00	1.03	1.34	16.9
8	T1	203	3.1	203	3.1	0.466	39.9	LOS C	7.5	53.6	0.87	0.74	0.87	23.9
9	R2	33	3.2	33	3.2	0.466	44.5	LOS D	7.5	53.6	0.87	0.74	0.87	23.9
Approach		492	2.1	492	2.1	0.890	57.2	LOS E	12.0	84.9	0.94	0.89	1.11	19.7
West: Carlingford Rd														
10	L2	20	0.0	20	0.0	* 0.897	52.0	LOS D	25.1	180.9	0.96	1.03	1.15	36.5
11	T1	1104	3.4	1104	3.4	0.897	47.1	LOS D	25.1	180.9	0.96	1.04	1.15	31.6
12	R2	2	100.0	2	100.0	0.897	54.1	LOS D	23.9	172.6	0.96	1.04	1.16	31.4
Approach		1127	3.5	1127	3.5	0.897	47.2	LOS D	25.1	180.9	0.96	1.04	1.15	31.7
All Vehicles		3000	3.5	3000	3.5	1.895	73.9	LOS F	25.1	180.9	0.87	0.92	1.12	16.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Rawson St											
P1	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	87.8	34.2	0.39
East: Carlingford Rd											
P2	Full	168	59.6	LOS E	0.6	0.6	0.96	0.96	88.6	34.8	0.39

North: Ray Rd										
P3 Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	87.1	33.4	0.38
West: Carlingford Rd										
P4 Full	316	59.9	LOS E	1.1	1.1	0.97	0.97	88.9	34.8	0.39
All Pedestrians	589	59.7	LOS E	1.1	1.1	0.96	0.96	88.6	34.6	0.39

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 3 [3. Rawson St/ Bridge St AM (Site Folder: 4 - Background Growth with Development)]

Network: N101 [Sc. 4 AM - with POS mitigation (Network Folder: Scenario 4 BG & Pdev)]

Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson Street														
1	L2	8	0.0	8	0.0	0.517	13.3	LOS A	1.5	10.6	0.81	0.98	0.98	41.5
2	T1	144	0.7	144	0.7	0.517	13.2	LOS A	1.5	10.6	0.81	0.98	0.98	36.2
3	R2	84	0.0	84	0.0	0.517	17.0	LOS B	1.5	10.6	0.81	0.98	0.98	36.6
Approach		237	0.4	237	0.4	0.517	14.5	LOS B	1.5	10.6	0.81	0.98	0.98	36.6
East: Bridge Street														
4	L2	37	0.0	37	0.0	0.582	13.8	LOS A	2.0	14.1	0.85	1.01	1.06	36.6
5	T1	125	2.5	125	2.5	0.582	13.9	LOS A	2.0	14.1	0.85	1.01	1.06	37.5
6	R2	115	0.9	115	0.9	0.582	17.4	LOS B	2.0	14.1	0.85	1.01	1.06	17.6
6u	U	2	0.0	2	0.0	0.582	18.9	LOS B	2.0	14.1	0.85	1.01	1.06	11.8
Approach		279	1.5	279	1.5	0.582	15.4	LOS B	2.0	14.1	0.85	1.01	1.06	32.7
North: Rawson Street														
7	L2	49	27.7	49	27.7	0.762	14.8	LOS B	3.2	23.6	0.68	0.92	0.92	27.6
8	T1	179	0.6	179	0.6	0.762	13.1	LOS A	3.2	23.6	0.68	0.92	0.92	38.7
9	R2	180	4.7	180	4.7	0.762	16.9	LOS B	3.2	23.6	0.68	0.92	0.92	38.7
9u	U	43	0.0	43	0.0	0.762	18.2	LOS B	3.2	23.6	0.68	0.92	0.92	24.2
Approach		452	5.1	452	5.1	0.762	15.3	LOS B	3.2	23.6	0.68	0.92	0.92	37.3
West: Bridge Street														
10	L2	229	1.4	229	1.4	0.801	21.4	LOS B	4.1	29.4	0.97	1.25	1.56	31.5
11	T1	136	3.9	136	3.9	0.801	21.7	LOS B	4.1	29.4	0.97	1.25	1.56	33.6
12	R2	21	0.0	21	0.0	0.801	25.1	LOS B	4.1	29.4	0.97	1.25	1.56	38.7
12u	U	14	0.0	14	0.0	0.801	26.7	LOS B	4.1	29.4	0.97	1.25	1.56	39.2
Approach		400	2.1	400	2.1	0.801	21.9	LOS B	4.1	29.4	0.97	1.25	1.56	33.2
All Vehicles		1367	2.7	1367	2.7	0.801	17.1	LOS B	4.1	29.4	0.82	1.04	1.14	35.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 216 [4. Blaxland Rd/ Epping Rd - AM (Site Folder: 4 - Background Growth with Development)]

Network: N101 [Sc. 4 AM - with POS mitigation (Network Folder: Scenario 4 BG & Pdev)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Blaxland Rd														
21a	L1	599	4.2	599	4.2	0.331	24.6	LOS B	6.9	49.9	0.63	0.75	0.63	33.3
22	T1	189	3.3	189	3.3	0.697	60.1	LOS E	7.3	52.3	1.00	0.85	1.05	28.8
Approach		788	4.0	788	4.0	0.697	33.1	LOS C	7.3	52.3	0.72	0.77	0.73	31.4
East: Epping Rd														
4b	L3	20	5.3	20	5.3	0.041	40.0	LOS C	0.5	3.9	0.73	0.70	0.73	35.9
5	T1	1271	3.2	1271	3.2	* 0.880	49.0	LOS D	25.8	184.3	1.00	1.00	1.12	23.2
Approach		1291	3.2	1291	3.2	0.880	48.9	LOS D	25.8	185.7	1.00	0.99	1.12	23.4
NorthWest: Langston Pl														
27a	L1	44	9.5	44	9.5	0.581	66.3	LOS E	3.9	28.7	1.00	0.79	1.00	27.4
28	T1	273	1.5	273	1.5	* 0.775	61.9	LOS E	8.5	60.6	1.00	0.88	1.09	28.4
Approach		317	2.7	317	2.7	0.775	62.5	LOS E	8.5	60.6	1.00	0.87	1.08	28.3
West: Epping Rd														
10b	L3	329	3.8	322	3.7	0.811	13.7	LOS A	13.9	99.7	0.48	0.61	0.48	47.6
11	T1	1899	1.8	1862	1.8	0.811	7.0	LOS A	23.2	164.7	0.50	0.52	0.50	52.5
12a	R1	541	1.5	530	1.5	* 0.970	62.9	LOS E	18.6	131.8	1.00	1.09	1.34	27.8
Approach		2769	2.0	2715 N1	1.9	0.970	18.7	LOS B	23.2	164.7	0.60	0.64	0.66	44.3
All Vehicles		5165	2.6	5111 N1	2.7	0.970	31.3	LOS C	25.8	185.7	0.74	0.77	0.81	35.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: Blaxland Rd											
P5	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	226.5	217.4	0.96
East: Epping Rd											
P2	Full	242	59.7	LOS E	0.9	0.9	0.96	0.96	227.7	218.4	0.96
NorthWest: Langston Pl											
P7	Full	232	59.7	LOS E	0.8	0.8	0.96	0.96	223.2	212.5	0.95
All Pedestrians		526	59.7	LOS E	0.9	0.9	0.96	0.96	225.6	215.7	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 1068 [5. Midson Rd/ Carlingford Rd - AM (Site Folder: 4 - Background Growth with Development)]

Network: N101 [Sc. 4 AM - with POS mitigation (Network Folder: Scenario 4 BG & Pdev)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 125 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Midson Rd														
1	L2	55	1.9	55	1.9	0.493	50.4	LOS D	6.9	48.6	0.92	0.78	0.92	31.5
2	T1	299	0.4	299	0.4	* 0.822	50.7	LOS D	12.6	89.8	0.96	0.86	1.03	29.1
3	R2	182	4.0	182	4.0	0.822	60.6	LOS E	12.6	89.8	1.00	0.94	1.14	19.5
Approach		536	1.8	536	1.8	0.822	54.0	LOS D	12.6	89.8	0.97	0.88	1.05	26.6
East: Carlingford Rd														
4	L2	46	4.5	46	4.5	0.917	70.7	LOS F	20.1	145.7	1.00	1.09	1.28	32.0
5	T1	824	3.8	824	3.8	* 0.917	64.8	LOS E	20.1	145.7	1.00	1.09	1.29	33.6
6	R2	143	2.2	143	2.2	0.416	32.0	LOS C	3.1	21.8	0.92	0.79	0.92	40.8
Approach		1014	3.6	1014	3.6	0.917	60.4	LOS E	20.1	145.7	0.99	1.05	1.24	34.3
North: Midson Rd														
7	L2	32	0.0	32	0.0	0.550	58.4	LOS E	5.3	36.8	0.97	0.83	0.97	20.2
8	T1	335	0.0	335	0.0	* 0.917	65.9	LOS E	11.5	80.7	0.99	1.00	1.23	26.2
9	R2	53	0.0	53	0.0	0.917	77.6	LOS F	11.5	80.7	1.00	1.10	1.38	25.6
Approach		419	0.0	419	0.0	0.917	66.8	LOS E	11.5	80.7	0.99	1.00	1.23	25.8
West: Carlingford Rd														
10	L2	22	0.0	22	0.0	0.910	68.2	LOS E	20.3	147.2	1.00	1.08	1.26	28.0
11	T1	834	4.0	834	4.0	0.910	62.6	LOS E	20.3	147.2	0.99	1.07	1.26	19.9
12	R2	273	1.5	273	1.5	* 0.771	44.2	LOS D	7.7	54.8	1.00	0.90	1.09	32.7
Approach		1128	3.4	1128	3.4	0.910	58.3	LOS E	20.3	147.2	0.99	1.03	1.22	23.6
All Vehicles		3097	2.7	3097	2.7	0.917	59.4	LOS E	20.3	147.2	0.99	1.00	1.20	28.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Midson Rd											
P1	Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	223.2	216.4	0.97
East: Carlingford Rd											
P2	Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	223.2	216.4	0.97
North: Midson Rd											
P3	Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	219.7	211.8	0.96

All Pedestrians	158	56.8	LOS E	0.2	0.2	0.95	0.95	222.1	214.9	0.97

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 101vv [6. Site Access AM (Site Folder: 4 - Background Growth with Development)]

Network: N101 [Sc. 4 AM - with POS mitigation (Network Folder: Scenario 4 BG & Pdev)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson Street														
1	L2	122	0.9	122	0.9	0.320	8.0	LOS A	0.4	3.1	0.45	0.24	0.51	37.7
2	T1	271	1.9	271	1.9	0.320	2.7	LOS A	0.4	3.1	0.45	0.24	0.51	24.2
Approach		393	1.6	393	1.6	0.320	4.4	NA	0.4	3.1	0.45	0.24	0.51	34.2
North: Rawson Street														
8	T1	334	7.3	334	7.3	0.308	3.5	LOS A	0.6	4.4	0.36	0.09	0.43	30.0
9	R2	44	2.4	44	2.4	0.308	14.7	LOS B	0.6	4.4	0.36	0.09	0.43	37.8
Approach		378	6.7	378	6.7	0.308	4.8	NA	0.6	4.4	0.36	0.09	0.43	33.0
West: Site Acces														
10	L2	126	1.7	126	1.7	0.395	10.5	LOS A	0.6	4.2	0.69	0.93	0.91	32.0
12	R2	33	0.0	33	0.0	0.395	16.0	LOS B	0.6	4.2	0.69	0.93	0.91	32.0
Approach		159	1.3	159	1.3	0.395	11.7	LOS A	0.6	4.2	0.69	0.93	0.91	32.0
All Vehicles		929	3.6	929	3.6	0.395	5.8	NA	0.6	4.4	0.45	0.30	0.55	33.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 101v [XM. Rawson St AM - Pedestrian Operated Signals (Site Folder: Scenario 4 - Redistribution of Existing Traffic (AM only))]

Network: N101 [Sc. 4 AM - with POS mitigation (Network Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic)]

New Site
Site Category: (None)
Pedestrian Crossing (Signalised) - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 40 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson Street														
2	T1	489	1.1	489	1.1	* 0.589	9.8	LOS A	4.6	32.8	0.82	0.71	0.82	28.4
Approach		489	1.1	489	1.1	0.589	9.8	LOS A	4.6	32.8	0.82	0.71	0.82	28.4
North: Rawson Street														
8	T1	452	5.1	452	5.1	0.557	9.7	LOS A	4.2	30.8	0.80	0.69	0.80	14.5
Approach		452	5.1	452	5.1	0.557	9.7	LOS A	4.2	30.8	0.80	0.69	0.80	14.5
All Vehicles		941	3.0	941	3.0	0.589	9.8	LOS A	4.6	32.8	0.81	0.70	0.81	23.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Rawson Street											
P1	Full	858	15.0	LOS B	0.9	0.9	0.88	0.88	175.8	209.0	1.19
All Pedestrians		858	15.0	LOS B	0.9	0.9	0.88	0.88	175.8	209.0	1.19

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: \\Au2019-ppfss01\shared_projects\301400281\technical\modelling\sid_240422_0281_epping_town_centre_rts_sc4.sip9

MOVEMENT SUMMARY

Site: 706 [1. Beecroft Rd/ Carlingford Rd AM (Site Folder: Scenario 4 - Redistribution of Existing Traffic (AM only))]

Network: N101 [Sc. 4 AM - with POS mitigation (Network Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Beecroft Road														
1	L2	763	4.5	763	4.5	0.528	11.2	LOS A	5.3	38.9	0.39	0.69	0.39	41.4
2	T1	1070	2.7	1070	2.7	* 1.006	73.9	LOS F	31.7	226.8	0.98	1.17	1.37	25.4
Approach		1833	3.5	1833	3.5	1.006	47.8	LOS D	31.7	226.8	0.73	0.97	0.96	28.1
North: Beecroft Road														
8	T1	1354	0.9	1354	0.9	0.637	24.1	LOS B	12.1	85.6	0.73	0.64	0.73	33.8
9	R2	227	6.0	227	6.0	* 0.997	122.0	LOS F	6.6	48.5	1.00	1.16	1.85	12.1
Approach		1581	1.6	1581	1.6	0.997	38.1	LOS C	12.1	85.6	0.77	0.72	0.89	26.9
West: Carlingford Road														
10	L2	78	10.8	77	10.7	1.004	56.6	LOS E	6.9	50.0	1.00	1.02	1.41	15.4
12	R2	1445	3.1	1426	3.1	* 1.004	72.7	LOS F	7.0	50.0	1.00	1.06	1.42	2.6
Approach		1523	3.5	1502 N1	3.4	1.004	71.9	LOS F	7.0	50.0	1.00	1.06	1.42	3.5
All Vehicles		4937	2.9	4916 N1	2.9	1.006	52.1	LOS D	31.7	226.8	0.83	0.92	1.08	19.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Beecroft Road											
P1B	Slip/ Bypass	53	59.3	LOS E	0.2	0.2	0.96	0.96	81.8	27.0	0.33
West: Carlingford Road											
P4	Full	7	59.2	LOS E	0.0	0.0	0.95	0.95	88.3	35.0	0.40
All Pedestrians		60	59.3	LOS E	0.2	0.2	0.96	0.96	82.6	28.0	0.34

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 1015 [2. Carlingford Rd/ Ray Rd/ Rawson St AM (Site Folder: Scenario 4 - Redistribution of Existing Traffic (AM only))]

Network: N101 [Sc. 4 AM - with POS mitigation (Network Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic)]

NRT 6AM - 10AM, 3PM - 7PM
N Leg Parking Restrictions AM
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson St														
1	L2	127	0.8	127	0.8	0.421	42.8	LOS D	8.3	58.7	0.85	0.76	0.85	7.9
2	T1	144	0.7	144	0.7	0.421	38.2	LOS C	8.3	58.7	0.85	0.76	0.85	26.0
3	R2	83	5.1	83	5.1	1.379	411.4	LOS F	9.6	70.0	1.00	1.66	3.30	0.9
Approach		355	1.8	355	1.8	1.379	127.3	LOS F	9.6	70.0	0.88	0.97	1.42	7.2
East: Carlingford Rd														
4	L2	174	9.7	174	9.7	0.499	22.3	LOS B	6.8	50.0	0.66	0.65	0.66	10.0
5	T1	807	3.4	807	3.4	0.499	21.4	LOS B	6.9	50.0	0.72	0.67	0.72	9.1
6	R2	4	100.0	4	100.0	0.499	27.5	LOS B	6.9	50.0	0.77	0.69	0.77	31.0
Approach		985	4.9	985	4.9	0.499	21.6	LOS B	6.9	50.0	0.71	0.67	0.71	9.5
North: Ray Rd														
7	L2	256	1.2	256	1.2	* 0.912	79.2	LOS F	12.6	89.0	1.00	1.06	1.40	16.0
8	T1	203	3.1	203	3.1	0.478	40.8	LOS C	7.6	54.3	0.87	0.75	0.87	23.6
9	R2	33	3.2	33	3.2	0.478	45.4	LOS D	7.6	54.3	0.87	0.75	0.87	23.6
Approach		492	2.1	492	2.1	0.912	61.1	LOS E	12.6	89.0	0.94	0.91	1.15	18.9
West: Carlingford Rd														
10	L2	20	0.0	20	0.0	0.917	57.5	LOS E	27.7	198.9	0.98	1.08	1.21	35.0
11	T1	1145	3.3	1145	3.3	* 0.917	52.9	LOS D	27.7	198.9	0.98	1.09	1.22	29.9
12	R2	2	100.0	2	100.0	0.917	60.1	LOS E	27.4	198.0	0.98	1.10	1.23	29.6
Approach		1167	3.4	1167	3.4	0.917	53.0	LOS D	27.7	198.9	0.98	1.09	1.22	30.0
All Vehicles		2999	3.5	2999	3.5	1.379	52.8	LOS D	27.7	198.9	0.87	0.91	1.06	20.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Rawson St											
P1	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	87.8	34.2	0.39
East: Carlingford Rd											

P2 Full	168	59.6	LOS E	0.6	0.6	0.96	0.96	88.6	34.8	0.39
North: Ray Rd										
P3 Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	87.1	33.4	0.38
West: Carlingford Rd										
P4 Full	316	59.9	LOS E	1.1	1.1	0.97	0.97	88.9	34.8	0.39
All Pedestrians	589	59.7	LOS E	1.1	1.1	0.96	0.96	88.6	34.6	0.39

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 3 [3. Rawson St/ Bridge St AM (Site Folder: Scenario 4 - Redistribution of Existing Traffic (AM only))]

Network: N101 [Sc. 4 AM - with POS mitigation (Network Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic)]

Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson Street														
1	L2	8	0.0	8	0.0	0.480	12.5	LOS A	1.3	9.3	0.79	0.95	0.92	41.8
2	T1	127	0.8	127	0.8	0.480	12.4	LOS A	1.3	9.3	0.79	0.95	0.92	36.7
3	R2	84	0.0	84	0.0	0.480	16.2	LOS B	1.3	9.3	0.79	0.95	0.92	37.0
Approach		220	0.5	220	0.5	0.480	13.8	LOS A	1.3	9.3	0.79	0.95	0.92	37.1
East: Bridge Street														
4	L2	37	0.0	37	0.0	0.582	13.8	LOS A	2.0	14.1	0.85	1.01	1.06	36.6
5	T1	125	2.5	125	2.5	0.582	13.9	LOS A	2.0	14.1	0.85	1.01	1.06	37.5
6	R2	115	0.9	115	0.9	0.582	17.4	LOS B	2.0	14.1	0.85	1.01	1.06	17.6
6u	U	2	0.0	2	0.0	0.582	18.9	LOS B	2.0	14.1	0.85	1.01	1.06	11.8
Approach		279	1.5	279	1.5	0.582	15.4	LOS B	2.0	14.1	0.85	1.01	1.06	32.8
North: Rawson Street														
7	L2	49	27.7	49	27.7	0.760	14.8	LOS B	3.2	23.4	0.68	0.91	0.91	27.7
8	T1	179	0.6	179	0.6	0.760	13.1	LOS A	3.2	23.4	0.68	0.91	0.91	38.8
9	R2	180	4.7	180	4.7	0.760	16.9	LOS B	3.2	23.4	0.68	0.91	0.91	38.8
9u	U	43	0.0	43	0.0	0.760	18.1	LOS B	3.2	23.4	0.68	0.91	0.91	24.3
Approach		452	5.1	452	5.1	0.760	15.3	LOS B	3.2	23.4	0.68	0.91	0.91	37.3
West: Bridge Street														
10	L2	204	1.5	204	1.5	0.734	17.2	LOS B	3.2	23.0	0.91	1.14	1.32	34.0
11	T1	136	3.9	136	3.9	0.734	17.5	LOS B	3.2	23.0	0.91	1.14	1.32	36.0
12	R2	21	0.0	21	0.0	0.734	20.8	LOS B	3.2	23.0	0.91	1.14	1.32	40.6
12u	U	14	0.0	14	0.0	0.734	22.4	LOS B	3.2	23.0	0.91	1.14	1.32	41.0
Approach		375	2.2	375	2.2	0.734	17.7	LOS B	3.2	23.0	0.91	1.14	1.32	35.6
All Vehicles		1325	2.8	1325	2.8	0.760	15.7	LOS B	3.2	23.4	0.80	1.00	1.06	36.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 216 [4. Blaxland Rd/ Epping Rd - AM (Site Folder: Scenario 4 - Redistribution of Existing Traffic (AM only))]

Network: N101 [Sc. 4 AM - with POS mitigation (Network Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Blaxland Rd														
21a	L1	599	4.2	599	4.2	0.330	24.6	LOS B	6.9	49.8	0.63	0.75	0.63	33.3
22	T1	189	3.3	189	3.3	0.697	60.1	LOS E	7.3	52.3	1.00	0.85	1.05	28.8
Approach		788	4.0	788	4.0	0.697	33.1	LOS C	7.3	52.3	0.72	0.77	0.73	31.4
East: Epping Rd														
4b	L3	20	5.3	20	5.3	0.041	40.0	LOS C	0.5	3.9	0.73	0.70	0.73	35.9
5	T1	1271	3.2	1271	3.2	* 0.879	48.9	LOS D	25.8	184.1	1.00	1.00	1.12	23.2
Approach		1291	3.2	1291	3.2	0.879	48.8	LOS D	25.8	185.3	1.00	0.99	1.12	23.5
NorthWest: Langston Pl														
27a	L1	44	9.5	44	9.5	0.581	66.3	LOS E	3.9	28.7	1.00	0.79	1.00	27.4
28	T1	273	1.5	273	1.5	* 0.775	61.9	LOS E	8.5	60.6	1.00	0.88	1.09	28.4
Approach		317	2.7	317	2.7	0.775	62.5	LOS E	8.5	60.6	1.00	0.87	1.08	28.3
West: Epping Rd														
10b	L3	329	3.8	326	3.7	0.820	13.4	LOS A	14.0	100.1	0.48	0.61	0.48	47.7
11	T1	1899	1.8	1882	1.8	0.820	6.8	LOS A	23.3	165.6	0.50	0.52	0.50	52.7
12a	R1	541	1.5	536	1.5	* 0.980	71.1	LOS F	19.1	135.5	1.00	1.15	1.37	26.0
Approach		2769	2.0	2743 N1	1.9	0.980	20.1	LOS B	23.3	165.6	0.59	0.65	0.67	43.4
All Vehicles		5165	2.6	5139 N1	2.6	0.980	31.9	LOS C	25.8	185.3	0.74	0.77	0.81	35.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: Blaxland Rd											
P5	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	226.5	217.4	0.96
East: Epping Rd											
P2	Full	242	59.7	LOS E	0.9	0.9	0.96	0.96	227.7	218.4	0.96
NorthWest: Langston Pl											

P7 Full	232	59.7	LOS E	0.8	0.8	0.96	0.96	223.2	212.5	0.95
All Pedestrians	526	59.7	LOS E	0.9	0.9	0.96	0.96	225.6	215.7	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 1068 [5. Midson Rd/ Carlingford Rd - AM (Site Folder: Scenario 4 - Redistribution of Existing Traffic (AM only))]

Network: N101 [Sc. 4 AM - with POS mitigation (Network Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 125 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Midson Rd														
1	L2	55	1.9	55	1.9	0.533	50.9	LOS D	7.5	53.0	0.93	0.79	0.93	31.4
2	T1	299	0.4	299	0.4	* 0.888	53.7	LOS D	14.7	105.1	0.96	0.88	1.07	28.5
3	R2	224	3.3	224	3.3	0.888	68.2	LOS E	14.7	105.1	1.00	1.01	1.25	18.0
Approach		578	1.6	578	1.6	0.888	59.0	LOS E	14.7	105.1	0.97	0.93	1.13	25.2
East: Carlingford Rd														
4	L2	46	4.5	46	4.5	0.917	70.7	LOS F	20.1	145.7	1.00	1.09	1.28	32.0
5	T1	824	3.8	824	3.8	* 0.917	64.8	LOS E	20.1	145.7	1.00	1.09	1.29	33.6
6	R2	143	2.2	143	2.2	0.416	32.0	LOS C	3.1	21.8	0.92	0.79	0.92	40.8
Approach		1014	3.6	1014	3.6	0.917	60.4	LOS E	20.1	145.7	0.99	1.05	1.24	34.3
North: Midson Rd														
7	L2	32	0.0	32	0.0	0.550	58.4	LOS E	5.3	36.8	0.97	0.83	0.97	20.2
8	T1	335	0.0	335	0.0	* 0.917	65.9	LOS E	11.5	80.7	0.99	1.00	1.23	26.2
9	R2	53	0.0	53	0.0	0.917	77.6	LOS F	11.5	80.7	1.00	1.10	1.38	25.6
Approach		419	0.0	419	0.0	0.917	66.8	LOS E	11.5	80.7	0.99	1.00	1.23	25.8
West: Carlingford Rd														
10	L2	22	0.0	22	0.0	0.910	68.2	LOS E	20.3	147.2	1.00	1.08	1.26	28.0
11	T1	834	4.0	834	4.0	0.910	62.6	LOS E	20.3	147.2	0.99	1.07	1.26	19.9
12	R2	273	1.5	273	1.5	* 0.771	44.2	LOS D	7.7	54.8	1.00	0.90	1.09	32.7
Approach		1128	3.4	1128	3.4	0.910	58.3	LOS E	20.3	147.2	0.99	1.03	1.22	23.6
All Vehicles		3139	2.7	3139	2.7	0.917	60.2	LOS E	20.3	147.2	0.99	1.01	1.21	28.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Midson Rd											
P1	Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	223.2	216.4	0.97
East: Carlingford Rd											
P2	Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	223.2	216.4	0.97
North: Midson Rd											

P3 Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	219.7	211.8	0.96
All Pedestrians	158	56.8	LOS E	0.2	0.2	0.95	0.95	222.1	214.9	0.97

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 101vv [6. Site Access AM (Site Folder: Scenario 4 - Redistribution of Existing Traffic (AM only))]

Network: N101 [Sc. 4 AM - with POS mitigation (Network Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson Street														
1	L2	122	0.9	122	0.9	0.315	7.9	LOS A	0.6	4.4	0.47	0.27	0.53	37.5
2	T1	228	2.3	228	2.3	0.315	2.9	LOS A	0.6	4.4	0.47	0.27	0.53	23.5
Approach		351	1.8	351	1.8	0.315	4.6	NA	0.6	4.4	0.47	0.27	0.53	34.3
North: Rawson Street														
8	T1	334	7.3	334	7.3	0.301	3.0	LOS A	0.5	4.0	0.34	0.09	0.41	31.3
9	R2	44	2.4	44	2.4	0.301	13.8	LOS A	0.5	4.0	0.34	0.09	0.41	38.1
Approach		378	6.7	378	6.7	0.301	4.3	NA	0.5	4.0	0.34	0.09	0.41	34.0
West: Site Acces														
10	L2	126	1.7	126	1.7	0.324	9.4	LOS A	0.5	3.8	0.68	0.89	0.82	32.6
12	R2	33	0.0	33	0.0	0.324	14.9	LOS B	0.5	3.8	0.68	0.89	0.82	32.6
Approach		159	1.3	159	1.3	0.324	10.5	LOS A	0.5	3.8	0.68	0.89	0.82	32.6
All Vehicles		887	3.8	887	3.8	0.324	5.5	NA	0.6	4.4	0.45	0.30	0.53	33.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 101v [XM. Rawson St AM - Pedestrian Operated Signals (Site Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic - Remove Pedestrian Leg (AM Only))]

Network: N101 [Sc. 4 AM - with POS & Remove Ped mitigation (Network Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic)]

New Site
Site Category: (None)
Pedestrian Crossing (Signalised) - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 40 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson Street														
2	T1	489	1.1	489	1.1	* 0.589	9.8	LOS A	4.6	32.8	0.82	0.71	0.82	28.4
Approach		489	1.1	489	1.1	0.589	9.8	LOS A	4.6	32.8	0.82	0.71	0.82	28.4
North: Rawson Street														
8	T1	452	5.1	452	5.1	0.557	9.7	LOS A	4.2	30.8	0.80	0.69	0.80	14.5
Approach		452	5.1	452	5.1	0.557	9.7	LOS A	4.2	30.8	0.80	0.69	0.80	14.5
All Vehicles		941	3.0	941	3.0	0.589	9.8	LOS A	4.6	32.8	0.81	0.70	0.81	23.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Rawson Street											
P1	Full	858	15.0	LOS B	0.9	0.9	0.88	0.88	175.8	209.0	1.19
All Pedestrians		858	15.0	LOS B	0.9	0.9	0.88	0.88	175.8	209.0	1.19

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 706 [1. Beecroft Rd/ Carlingford Rd AM (Site Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic - Remove Pedestrian Leg (AM Only))]

Network: N101 [Sc. 4 AM - with POS & Remove Ped mitigation (Network Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Beecroft Road														
1	L2	763	4.5	763	4.5	0.528	11.2	LOS A	5.3	38.9	0.39	0.69	0.39	41.4
2	T1	1070	2.7	1070	2.7	* 1.026	85.3	LOS F	33.4	239.0	0.98	1.24	1.46	23.2
Approach		1833	3.5	1833	3.5	1.026	54.5	LOS D	33.4	239.0	0.73	1.01	1.01	26.0
North: Beecroft Road														
8	T1	1354	0.9	1354	0.9	0.652	24.8	LOS B	12.3	86.4	0.74	0.65	0.74	33.3
9	R2	227	6.0	227	6.0	* 0.997	122.0	LOS F	6.6	48.5	1.00	1.16	1.85	12.1
Approach		1581	1.6	1581	1.6	0.997	38.8	LOS C	12.3	86.4	0.78	0.72	0.90	26.6
West: Carlingford Road														
10	L2	78	10.8	78	10.8	1.000	53.8	LOS D	7.6	55.0	1.00	1.02	1.40	16.9
12	R2	1445	3.1	1445	3.1	* 1.000	62.6	LOS E	7.7	55.0	1.00	1.04	1.36	3.3
Approach		1523	3.5	1523	3.5	1.000	62.2	LOS E	7.7	55.0	1.00	1.04	1.36	4.3
All Vehicles		4937	2.9	4937	2.9	1.026	51.8	LOS D	33.4	239.0	0.83	0.93	1.08	19.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Beecroft Road											
P1B	Slip/ Bypass	53	59.3	LOS E	0.2	0.2	0.96	0.96	81.8	27.0	0.33
West: Carlingford Road											
P4	Full	7	59.2	LOS E	0.0	0.0	0.95	0.95	88.3	35.0	0.40
All Pedestrians		60	59.3	LOS E	0.2	0.2	0.96	0.96	82.6	28.0	0.34

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 1015 [2. Carlingford Rd/ Ray Rd/ Rawson St AM (Site Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic - Remove Pedestrian Leg (AM Only))]

Network: N101 [Sc. 4 AM - with POS & Remove Ped mitigation (Network Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic)]

NRT 6AM - 10AM, 3PM - 7PM
N Leg Parking Restrictions AM
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson St														
1	L2	127	0.8	127	0.8	0.347	35.4	LOS C	7.5	52.6	0.76	0.71	0.76	9.4
2	T1	144	0.7	144	0.7	0.347	30.8	LOS C	7.5	52.6	0.76	0.71	0.76	28.5
3	R2	83	5.1	83	5.1	* 0.977	120.2	LOS F	4.9	35.7	1.00	1.21	1.88	2.9
Approach		355	1.8	355	1.8	0.977	53.4	LOS D	7.5	52.6	0.82	0.83	1.02	14.7
East: Carlingford Rd														
4	L2	174	9.7	174	9.7	0.557	28.3	LOS B	7.5	55.0	0.79	0.75	0.79	8.6
5	T1	807	3.4	807	3.4	0.557	28.4	LOS B	7.6	55.0	0.84	0.77	0.84	7.6
6	R2	4	100.0	4	100.0	0.557	35.6	LOS C	7.6	55.0	0.88	0.78	0.88	27.8
Approach		985	4.9	985	4.9	0.557	28.4	LOS B	7.6	55.0	0.83	0.76	0.83	8.0
North: Ray Rd														
7	L2	256	1.2	256	1.2	0.715	43.0	LOS D	10.0	70.9	0.90	0.86	0.94	23.2
8	T1	203	3.1	203	3.1	0.386	33.0	LOS C	6.8	48.6	0.79	0.69	0.79	26.3
9	R2	33	3.2	33	3.2	0.386	37.5	LOS C	6.8	48.6	0.79	0.69	0.79	26.3
Approach		492	2.1	492	2.1	0.715	38.5	LOS C	10.0	70.9	0.85	0.78	0.87	24.6
West: Carlingford Rd														
10	L2	20	0.0	20	0.0	1.013	110.8	LOS F	38.1	274.3	1.00	1.38	1.58	25.4
11	T1	1145	3.3	1145	3.3	* 1.013	106.1	LOS F	38.1	274.3	1.00	1.38	1.59	19.8
12	R2	2	100.0	2	100.0	1.013	113.3	LOS F	36.0	259.6	1.00	1.39	1.60	19.7
Approach		1167	3.4	1167	3.4	1.013	106.2	LOS F	38.1	274.3	1.00	1.38	1.59	19.9
All Vehicles		2999	3.5	2999	3.5	1.013	63.3	LOS E	38.1	274.3	0.90	1.01	1.16	18.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Rawson St											
P1	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	87.8	34.2	0.39

North: Ray Rd										
P3 Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	87.1	33.4	0.38
West: Carlingford Rd										
P4 Full	316	59.9	LOS E	1.1	1.1	0.97	0.97	88.9	34.8	0.39
All Pedestrians	421	59.8	LOS E	1.1	1.1	0.96	0.96	88.6	34.6	0.39

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 3 [3. Rawson St/ Bridge St AM (Site Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic - Remove Pedestrian Leg (AM Only))]

Network: N101 [Sc. 4 AM - with POS & Remove Ped mitigation (Network Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic)]

Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson Street														
1	L2	8	0.0	8	0.0	0.480	12.5	LOS A	1.3	9.3	0.79	0.95	0.92	41.8
2	T1	127	0.8	127	0.8	0.480	12.4	LOS A	1.3	9.3	0.79	0.95	0.92	36.7
3	R2	84	0.0	84	0.0	0.480	16.2	LOS B	1.3	9.3	0.79	0.95	0.92	37.0
Approach		220	0.5	220	0.5	0.480	13.8	LOS A	1.3	9.3	0.79	0.95	0.92	37.1
East: Bridge Street														
4	L2	37	0.0	37	0.0	0.582	13.8	LOS A	2.0	14.1	0.85	1.01	1.06	36.6
5	T1	125	2.5	125	2.5	0.582	13.9	LOS A	2.0	14.1	0.85	1.01	1.06	37.5
6	R2	115	0.9	115	0.9	0.582	17.4	LOS B	2.0	14.1	0.85	1.01	1.06	17.6
6u	U	2	0.0	2	0.0	0.582	18.9	LOS B	2.0	14.1	0.85	1.01	1.06	11.8
Approach		279	1.5	279	1.5	0.582	15.4	LOS B	2.0	14.1	0.85	1.01	1.06	32.8
North: Rawson Street														
7	L2	49	27.7	49	27.7	0.760	14.8	LOS B	3.2	23.4	0.68	0.91	0.91	27.7
8	T1	179	0.6	179	0.6	0.760	13.1	LOS A	3.2	23.4	0.68	0.91	0.91	38.8
9	R2	180	4.7	180	4.7	0.760	16.9	LOS B	3.2	23.4	0.68	0.91	0.91	38.8
9u	U	43	0.0	43	0.0	0.760	18.1	LOS B	3.2	23.4	0.68	0.91	0.91	24.3
Approach		452	5.1	452	5.1	0.760	15.3	LOS B	3.2	23.4	0.68	0.91	0.91	37.3
West: Bridge Street														
10	L2	204	1.5	204	1.5	0.734	17.2	LOS B	3.2	23.0	0.91	1.14	1.32	34.0
11	T1	136	3.9	136	3.9	0.734	17.5	LOS B	3.2	23.0	0.91	1.14	1.32	36.0
12	R2	21	0.0	21	0.0	0.734	20.8	LOS B	3.2	23.0	0.91	1.14	1.32	40.6
12u	U	14	0.0	14	0.0	0.734	22.4	LOS B	3.2	23.0	0.91	1.14	1.32	41.0
Approach		375	2.2	375	2.2	0.734	17.7	LOS B	3.2	23.0	0.91	1.14	1.32	35.6
All Vehicles		1325	2.8	1325	2.8	0.760	15.7	LOS B	3.2	23.4	0.80	1.00	1.06	36.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 216 [4. Blaxland Rd/ Epping Rd - AM (Site Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic - Remove Pedestrian Leg (AM Only))]

Network: N101 [Sc. 4 AM - with POS & Remove Ped mitigation (Network Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Blaxland Rd														
21a	L1	599	4.2	599	4.2	0.330	24.6	LOS B	6.8	49.8	0.63	0.75	0.63	33.3
22	T1	189	3.3	189	3.3	0.697	60.1	LOS E	7.3	52.3	1.00	0.85	1.05	28.8
Approach		788	4.0	788	4.0	0.697	33.1	LOS C	7.3	52.3	0.72	0.77	0.73	31.4
East: Epping Rd														
4b	L3	20	5.3	20	5.3	0.041	40.0	LOS C	0.5	3.9	0.73	0.70	0.73	35.9
5	T1	1271	3.2	1271	3.2	* 0.879	48.9	LOS D	25.8	184.0	1.00	1.00	1.12	23.2
Approach		1291	3.2	1291	3.2	0.879	48.7	LOS D	25.8	185.2	1.00	0.99	1.12	23.5
NorthWest: Langston Pl														
27a	L1	44	9.5	44	9.5	0.581	66.3	LOS E	3.9	28.7	1.00	0.79	1.00	27.4
28	T1	273	1.5	273	1.5	* 0.775	61.9	LOS E	8.5	60.6	1.00	0.88	1.09	28.4
Approach		317	2.7	317	2.7	0.775	62.5	LOS E	8.5	60.6	1.00	0.87	1.08	28.3
West: Epping Rd														
10b	L3	329	3.8	326	3.7	0.820	13.4	LOS A	14.0	100.1	0.48	0.61	0.48	47.7
11	T1	1899	1.8	1881	1.8	0.820	6.8	LOS A	23.3	165.6	0.50	0.52	0.50	52.7
12a	R1	541	1.5	536	1.5	* 0.980	71.1	LOS F	19.1	135.5	1.00	1.15	1.37	26.0
Approach		2769	2.0	2743 N1	2.0	0.980	20.1	LOS B	23.3	165.6	0.59	0.65	0.67	43.4
All Vehicles		5165	2.6	5139 N1	2.6	0.980	31.9	LOS C	25.8	185.2	0.74	0.77	0.81	35.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: Blaxland Rd											
P5	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	226.5	217.4	0.96
East: Epping Rd											
P2	Full	242	59.7	LOS E	0.9	0.9	0.96	0.96	227.7	218.4	0.96
NorthWest: Langston Pl											

P7 Full	232	59.7	LOS E	0.8	0.8	0.96	0.96	223.2	212.5	0.95
All Pedestrians	526	59.7	LOS E	0.9	0.9	0.96	0.96	225.6	215.7	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 1068 [5. Midson Rd/ Carlingford Rd - AM (Site Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic - Remove Pedestrian Leg (AM Only))]

Network: N101 [Sc. 4 AM - with POS & Remove Ped mitigation (Network Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 125 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Midson Rd														
1	L2	55	1.9	55	1.9	0.533	50.9	LOS D	7.5	53.0	0.93	0.79	0.93	31.4
2	T1	299	0.4	299	0.4	* 0.888	53.7	LOS D	14.7	105.1	0.96	0.88	1.07	28.5
3	R2	224	3.3	224	3.3	0.888	68.2	LOS E	14.7	105.1	1.00	1.01	1.25	18.0
Approach		578	1.6	578	1.6	0.888	59.0	LOS E	14.7	105.1	0.97	0.93	1.13	25.2
East: Carlingford Rd														
4	L2	46	4.5	46	4.5	0.917	70.7	LOS F	20.1	145.7	1.00	1.09	1.28	32.0
5	T1	824	3.8	824	3.8	* 0.917	64.8	LOS E	20.1	145.7	1.00	1.09	1.29	33.6
6	R2	143	2.2	143	2.2	0.416	32.0	LOS C	3.1	21.8	0.92	0.79	0.92	40.8
Approach		1014	3.6	1014	3.6	0.917	60.4	LOS E	20.1	145.7	0.99	1.05	1.24	34.3
North: Midson Rd														
7	L2	32	0.0	32	0.0	0.550	58.4	LOS E	5.3	36.8	0.97	0.83	0.97	20.2
8	T1	335	0.0	335	0.0	* 0.917	65.9	LOS E	11.5	80.7	0.99	1.00	1.23	26.2
9	R2	53	0.0	53	0.0	0.917	77.6	LOS F	11.5	80.7	1.00	1.10	1.38	25.6
Approach		419	0.0	419	0.0	0.917	66.8	LOS E	11.5	80.7	0.99	1.00	1.23	25.8
West: Carlingford Rd														
10	L2	22	0.0	22	0.0	0.910	68.2	LOS E	20.3	147.2	1.00	1.08	1.26	28.0
11	T1	834	4.0	834	4.0	0.910	62.6	LOS E	20.3	147.2	0.99	1.07	1.26	19.9
12	R2	273	1.5	273	1.5	* 0.771	44.2	LOS D	7.7	54.8	1.00	0.90	1.09	32.7
Approach		1128	3.4	1128	3.4	0.910	58.3	LOS E	20.3	147.2	0.99	1.03	1.22	23.6
All Vehicles		3139	2.7	3139	2.7	0.917	60.2	LOS E	20.3	147.2	0.99	1.01	1.21	28.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Midson Rd											
P1	Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	223.2	216.4	0.97
East: Carlingford Rd											
P2	Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	223.2	216.4	0.97

North: Midson Rd										
P3 Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	219.7	211.8	0.96
All Pedestrians	158	56.8	LOS E	0.2	0.2	0.95	0.95	222.1	214.9	0.97

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 101vv [6. Site Access AM (Site Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic - Remove Pedestrian Leg (AM Only))]

Network: N101 [Sc. 4 AM - with POS & Remove Ped mitigation (Network Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson Street														
1	L2	122	0.9	122	0.9	0.285	7.8	LOS A	0.6	4.3	0.47	0.27	0.51	37.6
2	T1	228	2.3	228	2.3	0.285	2.8	LOS A	0.6	4.3	0.47	0.27	0.51	23.7
Approach		351	1.8	351	1.8	0.285	4.5	NA	0.6	4.3	0.47	0.27	0.51	34.4
North: Rawson Street														
8	T1	334	7.3	334	7.3	0.301	3.0	LOS A	0.5	4.0	0.34	0.09	0.41	31.3
9	R2	44	2.4	44	2.4	0.301	13.8	LOS A	0.5	4.0	0.34	0.09	0.41	38.1
Approach		378	6.7	378	6.7	0.301	4.3	NA	0.5	4.0	0.34	0.09	0.41	34.0
West: Site Acces														
10	L2	126	1.7	126	1.7	0.284	9.0	LOS A	0.5	3.6	0.68	0.87	0.77	32.8
12	R2	33	0.0	33	0.0	0.284	14.5	LOS A	0.5	3.6	0.68	0.87	0.77	32.8
Approach		159	1.3	159	1.3	0.284	10.1	LOS A	0.5	3.6	0.68	0.87	0.77	32.8
All Vehicles		887	3.8	887	3.8	0.301	5.4	NA	0.6	4.3	0.45	0.30	0.51	33.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 101v [XM. Rawson St AM - Pedestrian Operated Signals (Site Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic- CR 3 Lanes (AM Only))]

Network: N101 [Sc. 4 AM - with POS, CR mitigation (Network Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic)]

New Site
Site Category: (None)
Pedestrian Crossing (Signalised) - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 40 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson Street														
2	T1	489	1.1	489	1.1	* 0.589	9.8	LOS A	4.6	32.8	0.82	0.71	0.82	28.4
Approach		489	1.1	489	1.1	0.589	9.8	LOS A	4.6	32.8	0.82	0.71	0.82	28.4
North: Rawson Street														
8	T1	452	5.1	452	5.1	0.557	9.7	LOS A	4.2	30.8	0.80	0.69	0.80	14.5
Approach		452	5.1	452	5.1	0.557	9.7	LOS A	4.2	30.8	0.80	0.69	0.80	14.5
All Vehicles		941	3.0	941	3.0	0.589	9.8	LOS A	4.6	32.8	0.81	0.70	0.81	23.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Rawson Street											
P1	Full	858	15.0	LOS B	0.9	0.9	0.88	0.88	175.8	209.0	1.19
All Pedestrians		858	15.0	LOS B	0.9	0.9	0.88	0.88	175.8	209.0	1.19

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 706 [1. Beecroft Rd/ Carlingford Rd AM (Site Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic- CR 3 Lanes (AM Only))]

Network: N101 [Sc. 4 AM - with POS, CR mitigation (Network Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Beecroft Road														
1	L2	763	4.5	763	4.5	0.559	12.3	LOS A	6.0	43.3	0.43	0.70	0.43	40.2
2	T1	1070	2.7	1070	2.7	* 0.975	69.0	LOS E	30.1	215.5	0.94	1.12	1.30	26.5
Approach		1833	3.5	1833	3.5	0.975	45.4	LOS D	30.1	215.5	0.73	0.94	0.94	28.9
North: Beecroft Road														
8	T1	1354	0.9	1354	0.9	0.603	22.0	LOS B	11.7	82.8	0.70	0.61	0.70	35.2
9	R2	227	6.0	227	6.0	* 0.892	85.8	LOS F	5.4	39.9	1.00	1.03	1.49	16.0
Approach		1581	1.6	1581	1.6	0.892	31.1	LOS C	11.7	82.8	0.74	0.67	0.81	30.0
West: Carlingford Road														
10	L2	78	10.8	78	10.8	0.320	34.4	LOS C	6.7	49.1	0.83	0.80	0.83	29.0
12	R2	1445	3.1	1445	3.1	* 0.931	48.8	LOS D	7.0	50.0	0.96	0.96	1.14	4.8
Approach		1523	3.5	1523	3.5	0.931	48.1	LOS D	7.0	50.0	0.96	0.96	1.12	6.4
All Vehicles		4937	2.9	4937	2.9	0.975	41.7	LOS C	30.1	215.5	0.80	0.86	0.96	23.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Beecroft Road											
P1B	Slip/ Bypass	53	59.3	LOS E	0.2	0.2	0.96	0.96	81.8	27.0	0.33
West: Carlingford Road											
P4	Full	7	59.2	LOS E	0.0	0.0	0.95	0.95	90.8	38.0	0.42
All Pedestrians		60	59.3	LOS E	0.2	0.2	0.96	0.96	82.9	28.4	0.34

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 1015 [2. Carlingford Rd/ Ray Rd/ Rawson St AM (Site Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic- CR 3 Lanes (AM Only))]

Network: N101 [Sc. 4 AM - with POS, CR mitigation (Network Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic)]

NRT 6AM - 10AM, 3PM - 7PM
N Leg Parking Restrictions AM
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson St														
1	L2	127	0.8	127	0.8	0.334	38.0	LOS C	6.9	48.3	0.79	0.72	0.79	8.9
2	T1	144	0.7	144	0.7	* 0.996	50.9	LOS D	6.9	48.3	0.83	0.83	1.01	22.5
3	R2	83	5.1	83	5.1	0.996	121.5	LOS F	6.6	47.5	1.00	1.24	1.85	3.0
Approach		355	1.8	355	1.8	0.996	62.8	LOS E	6.9	48.3	0.85	0.89	1.13	13.1
East: Carlingford Rd														
4	L2	174	9.7	174	9.7	0.542	25.8	LOS B	6.8	50.0	0.74	0.71	0.74	8.7
5	T1	807	3.4	807	3.4	0.542	25.8	LOS B	6.9	50.0	0.80	0.73	0.80	7.8
6	R2	4	100.0	4	100.0	0.542	32.7	LOS C	6.9	50.0	0.84	0.75	0.84	28.9
Approach		985	4.9	985	4.9	0.542	25.9	LOS B	6.9	50.0	0.79	0.73	0.79	8.1
North: Ray Rd														
7	L2	256	1.2	256	1.2	0.800	54.6	LOS D	10.2	72.0	0.97	0.93	1.11	20.2
8	T1	203	3.1	203	3.1	0.587	48.4	LOS D	8.2	59.1	0.94	0.80	0.94	21.6
9	R2	33	3.2	33	3.2	0.587	52.9	LOS D	8.2	59.1	0.94	0.80	0.94	21.6
Approach		492	2.1	492	2.1	0.800	51.9	LOS D	10.2	72.0	0.96	0.87	1.03	20.9
West: Carlingford Rd														
10	L2	20	0.0	20	0.0	0.982	90.9	LOS F	34.8	250.4	1.00	1.27	1.45	28.3
11	T1	1145	3.3	1145	3.3	* 0.982	86.3	LOS F	34.8	250.4	1.00	1.28	1.46	22.7
12	R2	2	100.0	2	100.0	0.982	93.6	LOS F	32.8	236.7	1.00	1.29	1.47	22.5
Approach		1167	3.4	1167	3.4	0.982	86.4	LOS F	34.8	250.4	1.00	1.28	1.46	22.8
All Vehicles		2999	3.5	2999	3.5	0.996	58.1	LOS E	34.8	250.4	0.91	0.99	1.13	19.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Rawson St											
P1	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	87.8	34.2	0.39
East: Carlingford Rd											

P2 Full	168	59.6	LOS E	0.6	0.6	0.96	0.96	90.7	37.4	0.41
North: Ray Rd										
P3 Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	87.1	33.4	0.38
West: Carlingford Rd										
P4 Full	316	59.9	LOS E	1.1	1.1	0.97	0.97	88.9	34.8	0.39
All Pedestrians	589	59.7	LOS E	1.1	1.1	0.96	0.96	89.2	35.4	0.40

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 3 [3. Rawson St/ Bridge St AM (Site Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic- CR 3 Lanes (AM Only))]

Network: N101 [Sc. 4 AM - with POS, CR mitigation (Network Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic)]

Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson Street														
1	L2	8	0.0	8	0.0	0.480	12.5	LOS A	1.3	9.3	0.79	0.95	0.92	41.8
2	T1	127	0.8	127	0.8	0.480	12.4	LOS A	1.3	9.3	0.79	0.95	0.92	36.7
3	R2	84	0.0	84	0.0	0.480	16.2	LOS B	1.3	9.3	0.79	0.95	0.92	37.0
Approach		220	0.5	220	0.5	0.480	13.8	LOS A	1.3	9.3	0.79	0.95	0.92	37.1
East: Bridge Street														
4	L2	37	0.0	37	0.0	0.582	13.8	LOS A	2.0	14.1	0.85	1.01	1.06	36.6
5	T1	125	2.5	125	2.5	0.582	13.9	LOS A	2.0	14.1	0.85	1.01	1.06	37.5
6	R2	115	0.9	115	0.9	0.582	17.4	LOS B	2.0	14.1	0.85	1.01	1.06	17.6
6u	U	2	0.0	2	0.0	0.582	18.9	LOS B	2.0	14.1	0.85	1.01	1.06	11.8
Approach		279	1.5	279	1.5	0.582	15.4	LOS B	2.0	14.1	0.85	1.01	1.06	32.8
North: Rawson Street														
7	L2	49	27.7	49	27.7	0.760	14.8	LOS B	3.2	23.4	0.68	0.91	0.91	27.7
8	T1	179	0.6	179	0.6	0.760	13.1	LOS A	3.2	23.4	0.68	0.91	0.91	38.8
9	R2	180	4.7	180	4.7	0.760	16.9	LOS B	3.2	23.4	0.68	0.91	0.91	38.8
9u	U	43	0.0	43	0.0	0.760	18.1	LOS B	3.2	23.4	0.68	0.91	0.91	24.3
Approach		452	5.1	452	5.1	0.760	15.3	LOS B	3.2	23.4	0.68	0.91	0.91	37.3
West: Bridge Street														
10	L2	204	1.5	204	1.5	0.734	17.2	LOS B	3.2	23.0	0.91	1.14	1.32	34.0
11	T1	136	3.9	136	3.9	0.734	17.5	LOS B	3.2	23.0	0.91	1.14	1.32	36.0
12	R2	21	0.0	21	0.0	0.734	20.8	LOS B	3.2	23.0	0.91	1.14	1.32	40.6
12u	U	14	0.0	14	0.0	0.734	22.4	LOS B	3.2	23.0	0.91	1.14	1.32	41.0
Approach		375	2.2	375	2.2	0.734	17.7	LOS B	3.2	23.0	0.91	1.14	1.32	35.6
All Vehicles		1325	2.8	1325	2.8	0.760	15.7	LOS B	3.2	23.4	0.80	1.00	1.06	36.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 216 [4. Blaxland Rd/ Epping Rd - AM (Site Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic- CR 3 Lanes (AM Only))]

Network: N101 [Sc. 4 AM - with POS, CR mitigation (Network Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Blaxland Rd														
21a	L1	599	4.2	599	4.2	0.330	24.6	LOS B	6.8	49.8	0.63	0.75	0.63	33.3
22	T1	189	3.3	189	3.3	0.697	60.1	LOS E	7.3	52.3	1.00	0.85	1.05	28.8
Approach		788	4.0	788	4.0	0.697	33.1	LOS C	7.3	52.3	0.72	0.77	0.73	31.4
East: Epping Rd														
4b	L3	20	5.3	20	5.3	0.041	40.0	LOS C	0.5	3.9	0.73	0.70	0.73	35.9
5	T1	1271	3.2	1271	3.2	* 0.878	48.7	LOS D	25.7	183.9	1.00	1.00	1.12	23.3
Approach		1291	3.2	1291	3.2	0.878	48.6	LOS D	25.7	184.8	1.00	0.99	1.11	23.5
NorthWest: Langston Pl														
27a	L1	44	9.5	44	9.5	0.581	66.3	LOS E	3.9	28.7	1.00	0.79	1.00	27.4
28	T1	273	1.5	273	1.5	* 0.775	61.9	LOS E	8.5	60.6	1.00	0.88	1.09	28.4
Approach		317	2.7	317	2.7	0.775	62.5	LOS E	8.5	60.6	1.00	0.87	1.08	28.3
West: Epping Rd														
10b	L3	329	3.8	329	3.8	0.827	12.3	LOS A	12.6	90.4	0.43	0.58	0.43	48.5
11	T1	1899	1.8	1899	1.8	0.827	6.4	LOS A	23.8	168.9	0.49	0.51	0.49	53.0
12a	R1	541	1.5	541	1.5	* 0.990	75.7	LOS F	19.9	141.4	1.00	1.18	1.40	25.1
Approach		2769	2.0	2769	2.0	0.990	20.7	LOS B	23.8	168.9	0.58	0.65	0.66	43.1
All Vehicles		5165	2.6	5165	2.6	0.990	32.1	LOS C	25.7	184.8	0.73	0.77	0.81	35.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: Blaxland Rd											
P5	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	226.5	217.4	0.96
East: Epping Rd											
P2	Full	242	59.7	LOS E	0.9	0.9	0.96	0.96	227.7	218.4	0.96
NorthWest: Langston Pl											
P7	Full	232	59.7	LOS E	0.8	0.8	0.96	0.96	223.2	212.5	0.95
All Pedestrians		526	59.7	LOS E	0.9	0.9	0.96	0.96	225.6	215.7	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 1068 [5. Midson Rd/ Carlingford Rd - AM (Site Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic- CR 3 Lanes (AM Only))]

Network: N101 [Sc. 4 AM - with POS, CR mitigation (Network Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 125 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Midson Rd														
1	L2	55	1.9	55	1.9	0.533	50.9	LOS D	7.5	53.0	0.93	0.79	0.93	31.4
2	T1	299	0.4	299	0.4	* 0.888	53.7	LOS D	14.7	105.1	0.96	0.88	1.07	28.5
3	R2	224	3.3	224	3.3	0.888	68.2	LOS E	14.7	105.1	1.00	1.01	1.25	18.0
Approach		578	1.6	578	1.6	0.888	59.0	LOS E	14.7	105.1	0.97	0.93	1.13	25.2
East: Carlingford Rd														
4	L2	46	4.5	46	4.5	0.917	70.7	LOS F	20.1	145.7	1.00	1.09	1.28	32.0
5	T1	824	3.8	824	3.8	* 0.917	64.8	LOS E	20.1	145.7	1.00	1.09	1.29	33.6
6	R2	143	2.2	143	2.2	0.416	32.0	LOS C	3.1	21.8	0.92	0.79	0.92	40.8
Approach		1014	3.6	1014	3.6	0.917	60.4	LOS E	20.1	145.7	0.99	1.05	1.24	34.3
North: Midson Rd														
7	L2	32	0.0	32	0.0	0.550	58.4	LOS E	5.3	36.8	0.97	0.83	0.97	20.2
8	T1	335	0.0	335	0.0	* 0.917	65.9	LOS E	11.5	80.7	0.99	1.00	1.23	26.2
9	R2	53	0.0	53	0.0	0.917	77.6	LOS F	11.5	80.7	1.00	1.10	1.38	25.6
Approach		419	0.0	419	0.0	0.917	66.8	LOS E	11.5	80.7	0.99	1.00	1.23	25.8
West: Carlingford Rd														
10	L2	22	0.0	22	0.0	0.910	68.2	LOS E	20.3	147.2	1.00	1.08	1.26	28.0
11	T1	834	4.0	834	4.0	0.910	62.6	LOS E	20.3	147.2	0.99	1.07	1.26	19.9
12	R2	273	1.5	273	1.5	* 0.771	44.2	LOS D	7.7	54.8	1.00	0.90	1.09	32.7
Approach		1128	3.4	1128	3.4	0.910	58.3	LOS E	20.3	147.2	0.99	1.03	1.22	23.6
All Vehicles		3139	2.7	3139	2.7	0.917	60.2	LOS E	20.3	147.2	0.99	1.01	1.21	28.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Midson Rd											
P1	Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	223.2	216.4	0.97
East: Carlingford Rd											
P2	Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	223.2	216.4	0.97
North: Midson Rd											

P3 Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	219.7	211.8	0.96
All Pedestrians	158	56.8	LOS E	0.2	0.2	0.95	0.95	222.1	214.9	0.97

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 101vv [6. Site Access AM (Site Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic- CR 3 Lanes (AM Only))]

Network: N101 [Sc. 4 AM - with POS, CR mitigation (Network Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson Street														
1	L2	122	0.9	122	0.9	0.283	7.8	LOS A	0.6	4.3	0.47	0.27	0.50	37.6
2	T1	228	2.3	228	2.3	0.283	2.8	LOS A	0.6	4.3	0.47	0.27	0.50	23.7
Approach		351	1.8	351	1.8	0.283	4.5	NA	0.6	4.3	0.47	0.27	0.50	34.4
North: Rawson Street														
8	T1	334	7.3	334	7.3	0.301	3.0	LOS A	0.5	4.0	0.34	0.09	0.40	31.3
9	R2	44	2.4	44	2.4	0.301	13.8	LOS A	0.5	4.0	0.34	0.09	0.40	38.1
Approach		378	6.7	378	6.7	0.301	4.3	NA	0.5	4.0	0.34	0.09	0.40	34.0
West: Site Acces														
10	L2	126	1.7	126	1.7	0.280	9.0	LOS A	0.5	3.6	0.68	0.87	0.77	32.9
12	R2	33	0.0	33	0.0	0.280	14.2	LOS A	0.5	3.6	0.68	0.87	0.77	32.9
Approach		159	1.3	159	1.3	0.280	10.0	LOS A	0.5	3.6	0.68	0.87	0.77	32.9
All Vehicles		887	3.8	887	3.8	0.301	5.4	NA	0.6	4.3	0.45	0.30	0.51	33.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 101v [XM. Rawson St AM - Pedestrian Operated Signals (Site Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic - CR 3 Lanes & Remove Ped Leg (AM Only)]

Network: N101 [Sc. 4 AM - with POS, CR & Remove Ped mitigation (Network Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic)]

New Site
Site Category: (None)
Pedestrian Crossing (Signalised) - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 40 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson Street														
2	T1	489	1.1	489	1.1	* 0.589	9.8	LOS A	4.6	32.8	0.82	0.71	0.82	28.4
Approach		489	1.1	489	1.1	0.589	9.8	LOS A	4.6	32.8	0.82	0.71	0.82	28.4
North: Rawson Street														
8	T1	452	5.1	452	5.1	0.557	9.7	LOS A	4.2	30.8	0.80	0.69	0.80	14.5
Approach		452	5.1	452	5.1	0.557	9.7	LOS A	4.2	30.8	0.80	0.69	0.80	14.5
All Vehicles		941	3.0	941	3.0	0.589	9.8	LOS A	4.6	32.8	0.81	0.70	0.81	23.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Rawson Street											
P1	Full	858	15.0	LOS B	0.9	0.9	0.88	0.88	175.8	209.0	1.19
All Pedestrians		858	15.0	LOS B	0.9	0.9	0.88	0.88	175.8	209.0	1.19

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 706 [1. Beecroft Rd/ Carlingford Rd AM (Site Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic - CR 3 Lanes & Remove Ped Leg (AM Only)]

Network: N101 [Sc. 4 AM - with POS, CR & Remove Ped mitigation (Network Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Beecroft Road														
1	L2	763	4.5	763	4.5	0.559	12.3	LOS A	6.0	43.3	0.43	0.70	0.43	40.2
2	T1	1070	2.7	1070	2.7	* 0.975	69.0	LOS E	30.1	215.5	0.94	1.12	1.30	26.5
Approach		1833	3.5	1833	3.5	0.975	45.4	LOS D	30.1	215.5	0.73	0.94	0.94	28.9
North: Beecroft Road														
8	T1	1354	0.9	1354	0.9	0.603	22.0	LOS B	11.7	82.8	0.70	0.61	0.70	35.2
9	R2	227	6.0	227	6.0	* 0.892	85.8	LOS F	5.4	39.9	1.00	1.03	1.49	16.0
Approach		1581	1.6	1581	1.6	0.892	31.1	LOS C	11.7	82.8	0.74	0.67	0.81	30.0
West: Carlingford Road														
10	L2	78	10.8	78	10.8	0.320	34.3	LOS C	6.6	48.7	0.82	0.80	0.82	29.2
12	R2	1445	3.1	1445	3.1	* 0.931	43.4	LOS D	7.7	55.0	0.96	0.94	1.08	5.7
Approach		1523	3.5	1523	3.5	0.931	43.0	LOS D	7.7	55.0	0.95	0.93	1.07	7.4
All Vehicles		4937	2.9	4937	2.9	0.975	40.1	LOS C	30.1	215.5	0.80	0.85	0.94	24.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Beecroft Road											
P1B	Slip/ Bypass	53	59.3	LOS E	0.2	0.2	0.96	0.96	81.8	27.0	0.33
West: Carlingford Road											
P4	Full	7	59.2	LOS E	0.0	0.0	0.95	0.95	90.8	38.0	0.42
All Pedestrians		60	59.3	LOS E	0.2	0.2	0.96	0.96	82.9	28.4	0.34

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 1015 [2. Carlingford Rd/ Ray Rd/ Rawson St AM (Site Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic - CR 3 Lanes & Remove Ped Leg (AM Only)]

Network: N101 [Sc. 4 AM - with POS, CR & Remove Ped mitigation (Network Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic)]

NRT 6AM - 10AM, 3PM - 7PM
N Leg Parking Restrictions AM
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson St														
1	L2	127	0.8	127	0.8	0.326	35.8	LOS C	6.8	48.1	0.76	0.71	0.76	9.3
2	T1	144	0.7	144	0.7	* 0.972	43.8	LOS D	6.8	48.1	0.80	0.79	0.93	24.3
3	R2	83	5.1	83	5.1	0.972	112.9	LOS F	6.0	43.6	1.00	1.21	1.79	3.2
Approach		355	1.8	355	1.8	0.972	57.1	LOS E	6.8	48.1	0.83	0.86	1.07	14.0
East: Carlingford Rd														
4	L2	174	9.7	174	9.7	0.550	26.8	LOS B	7.5	55.0	0.73	0.70	0.73	9.0
5	T1	807	3.4	807	3.4	0.550	26.4	LOS B	7.6	55.0	0.80	0.73	0.80	8.1
6	R2	4	100.0	4	100.0	0.550	33.4	LOS C	7.6	55.0	0.85	0.75	0.85	28.8
Approach		985	4.9	985	4.9	0.550	26.5	LOS B	7.6	55.0	0.78	0.73	0.78	8.5
North: Ray Rd														
7	L2	256	1.2	256	1.2	0.676	41.0	LOS C	8.4	59.5	0.89	0.84	0.89	23.8
8	T1	203	3.1	203	3.1	0.550	46.3	LOS D	8.0	57.8	0.93	0.79	0.93	22.1
9	R2	33	3.2	33	3.2	0.550	50.9	LOS D	8.0	57.8	0.93	0.79	0.93	22.1
Approach		492	2.1	492	2.1	0.676	43.9	LOS D	8.4	59.5	0.91	0.81	0.91	23.0
West: Carlingford Rd														
10	L2	20	0.0	20	0.0	0.989	95.1	LOS F	35.8	257.4	1.00	1.29	1.48	27.7
11	T1	1145	3.3	1145	3.3	* 0.989	90.7	LOS F	35.8	257.4	1.00	1.30	1.49	22.0
12	R2	2	100.0	2	100.0	0.989	98.2	LOS F	33.3	240.1	1.00	1.31	1.50	21.8
Approach		1167	3.4	1167	3.4	0.989	90.7	LOS F	35.8	257.4	1.00	1.30	1.49	22.1
All Vehicles		2999	3.5	2999	3.5	0.989	58.0	LOS E	35.8	257.4	0.89	0.98	1.11	19.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Rawson St											
P1	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	87.8	34.2	0.39

North: Ray Rd										
P3 Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	87.1	33.4	0.38
West: Carlingford Rd										
P4 Full	316	59.9	LOS E	1.1	1.1	0.97	0.97	88.9	34.8	0.39
All Pedestrians	421	59.8	LOS E	1.1	1.1	0.96	0.96	88.6	34.6	0.39

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 3 [3. Rawson St/ Bridge St AM (Site Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic - CR 3 Lanes & Remove Ped Leg (AM Only)]

Network: N101 [Sc. 4 AM - with POS, CR & Remove Ped mitigation (Network Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic)]

Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson Street														
1	L2	8	0.0	8	0.0	0.480	12.5	LOS A	1.3	9.3	0.79	0.95	0.92	41.8
2	T1	127	0.8	127	0.8	0.480	12.4	LOS A	1.3	9.3	0.79	0.95	0.92	36.7
3	R2	84	0.0	84	0.0	0.480	16.2	LOS B	1.3	9.3	0.79	0.95	0.92	37.0
Approach		220	0.5	220	0.5	0.480	13.8	LOS A	1.3	9.3	0.79	0.95	0.92	37.1
East: Bridge Street														
4	L2	37	0.0	37	0.0	0.582	13.8	LOS A	2.0	14.1	0.85	1.01	1.06	36.6
5	T1	125	2.5	125	2.5	0.582	13.9	LOS A	2.0	14.1	0.85	1.01	1.06	37.5
6	R2	115	0.9	115	0.9	0.582	17.4	LOS B	2.0	14.1	0.85	1.01	1.06	17.6
6u	U	2	0.0	2	0.0	0.582	18.9	LOS B	2.0	14.1	0.85	1.01	1.06	11.8
Approach		279	1.5	279	1.5	0.582	15.4	LOS B	2.0	14.1	0.85	1.01	1.06	32.8
North: Rawson Street														
7	L2	49	27.7	49	27.7	0.760	14.8	LOS B	3.2	23.4	0.68	0.91	0.91	27.7
8	T1	179	0.6	179	0.6	0.760	13.1	LOS A	3.2	23.4	0.68	0.91	0.91	38.8
9	R2	180	4.7	180	4.7	0.760	16.9	LOS B	3.2	23.4	0.68	0.91	0.91	38.8
9u	U	43	0.0	43	0.0	0.760	18.1	LOS B	3.2	23.4	0.68	0.91	0.91	24.3
Approach		452	5.1	452	5.1	0.760	15.3	LOS B	3.2	23.4	0.68	0.91	0.91	37.3
West: Bridge Street														
10	L2	204	1.5	204	1.5	0.734	17.2	LOS B	3.2	23.0	0.91	1.14	1.32	34.0
11	T1	136	3.9	136	3.9	0.734	17.5	LOS B	3.2	23.0	0.91	1.14	1.32	36.0
12	R2	21	0.0	21	0.0	0.734	20.8	LOS B	3.2	23.0	0.91	1.14	1.32	40.6
12u	U	14	0.0	14	0.0	0.734	22.4	LOS B	3.2	23.0	0.91	1.14	1.32	41.0
Approach		375	2.2	375	2.2	0.734	17.7	LOS B	3.2	23.0	0.91	1.14	1.32	35.6
All Vehicles		1325	2.8	1325	2.8	0.760	15.7	LOS B	3.2	23.4	0.80	1.00	1.06	36.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 216 [4. Blaxland Rd/ Epping Rd - AM (Site Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic - CR 3 Lanes & Remove Ped Leg (AM Only)]

Network: N101 [Sc. 4 AM - with POS, CR & Remove Ped mitigation (Network Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Blaxland Rd														
21a	L1	599	4.2	599	4.2	0.330	24.6	LOS B	6.8	49.8	0.63	0.75	0.63	33.3
22	T1	189	3.3	189	3.3	0.697	60.1	LOS E	7.3	52.3	1.00	0.85	1.05	28.8
Approach		788	4.0	788	4.0	0.697	33.1	LOS C	7.3	52.3	0.72	0.77	0.73	31.4
East: Epping Rd														
4b	L3	20	5.3	20	5.3	0.041	40.0	LOS C	0.5	3.9	0.73	0.70	0.73	35.9
5	T1	1271	3.2	1271	3.2	* 0.878	48.7	LOS D	25.7	183.9	1.00	1.00	1.12	23.3
Approach		1291	3.2	1291	3.2	0.878	48.6	LOS D	25.7	184.8	1.00	0.99	1.11	23.5
NorthWest: Langston Pl														
27a	L1	44	9.5	44	9.5	0.581	66.3	LOS E	3.9	28.7	1.00	0.79	1.00	27.4
28	T1	273	1.5	273	1.5	* 0.775	61.9	LOS E	8.5	60.6	1.00	0.88	1.09	28.4
Approach		317	2.7	317	2.7	0.775	62.5	LOS E	8.5	60.6	1.00	0.87	1.08	28.3
West: Epping Rd														
10b	L3	329	3.8	329	3.8	0.827	12.3	LOS A	12.6	90.4	0.43	0.58	0.43	48.5
11	T1	1899	1.8	1899	1.8	0.827	6.4	LOS A	23.8	168.9	0.49	0.51	0.49	53.0
12a	R1	541	1.5	541	1.5	* 0.990	75.7	LOS F	19.9	141.4	1.00	1.18	1.40	25.1
Approach		2769	2.0	2769	2.0	0.990	20.7	LOS B	23.8	168.9	0.58	0.65	0.66	43.1
All Vehicles		5165	2.6	5165	2.6	0.990	32.1	LOS C	25.7	184.8	0.73	0.77	0.81	35.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: Blaxland Rd											
P5	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	226.5	217.4	0.96
East: Epping Rd											
P2	Full	242	59.7	LOS E	0.9	0.9	0.96	0.96	227.7	218.4	0.96
NorthWest: Langston Pl											
P7	Full	232	59.7	LOS E	0.8	0.8	0.96	0.96	223.2	212.5	0.95

All Pedestrians	526	59.7	LOS E	0.9	0.9	0.96	0.96	225.6	215.7	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 1068 [5. Midson Rd/ Carlingford Rd - AM (Site Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic - CR 3 Lanes & Remove Ped Leg (AM Only)]

Network: N101 [Sc. 4 AM - with POS, CR & Remove Ped mitigation (Network Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 125 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Midson Rd														
1	L2	55	1.9	55	1.9	0.533	50.9	LOS D	7.5	53.0	0.93	0.79	0.93	31.4
2	T1	299	0.4	299	0.4	* 0.888	53.7	LOS D	14.7	105.1	0.96	0.88	1.07	28.5
3	R2	224	3.3	224	3.3	0.888	68.2	LOS E	14.7	105.1	1.00	1.01	1.25	18.0
Approach		578	1.6	578	1.6	0.888	59.0	LOS E	14.7	105.1	0.97	0.93	1.13	25.2
East: Carlingford Rd														
4	L2	46	4.5	46	4.5	0.917	70.7	LOS F	20.1	145.7	1.00	1.09	1.28	32.0
5	T1	824	3.8	824	3.8	* 0.917	64.8	LOS E	20.1	145.7	1.00	1.09	1.29	33.6
6	R2	143	2.2	143	2.2	0.416	32.0	LOS C	3.1	21.8	0.92	0.79	0.92	40.8
Approach		1014	3.6	1014	3.6	0.917	60.4	LOS E	20.1	145.7	0.99	1.05	1.24	34.3
North: Midson Rd														
7	L2	32	0.0	32	0.0	0.550	58.4	LOS E	5.3	36.8	0.97	0.83	0.97	20.2
8	T1	335	0.0	335	0.0	* 0.917	65.9	LOS E	11.5	80.7	0.99	1.00	1.23	26.2
9	R2	53	0.0	53	0.0	0.917	77.6	LOS F	11.5	80.7	1.00	1.10	1.38	25.6
Approach		419	0.0	419	0.0	0.917	66.8	LOS E	11.5	80.7	0.99	1.00	1.23	25.8
West: Carlingford Rd														
10	L2	22	0.0	22	0.0	0.910	68.2	LOS E	20.3	147.2	1.00	1.08	1.26	28.0
11	T1	834	4.0	834	4.0	0.910	62.6	LOS E	20.3	147.2	0.99	1.07	1.26	19.9
12	R2	273	1.5	273	1.5	* 0.771	44.2	LOS D	7.7	54.8	1.00	0.90	1.09	32.7
Approach		1128	3.4	1128	3.4	0.910	58.3	LOS E	20.3	147.2	0.99	1.03	1.22	23.6
All Vehicles		3139	2.7	3139	2.7	0.917	60.2	LOS E	20.3	147.2	0.99	1.01	1.21	28.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Midson Rd											
P1	Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	223.2	216.4	0.97
East: Carlingford Rd											
P2	Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	223.2	216.4	0.97

North: Midson Rd										
P3 Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	219.7	211.8	0.96
All Pedestrians	158	56.8	LOS E	0.2	0.2	0.95	0.95	222.1	214.9	0.97

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 101vv [6. Site Access AM (Site Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic - CR 3 Lanes & Remove Ped Leg (AM Only)]

Network: N101 [Sc. 4 AM - with POS, CR & Remove Ped mitigation (Network Folder: Scenario 4 - Mitigations - Redistribution of Existing Traffic)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson Street														
1	L2	122	0.9	122	0.9	0.283	7.8	LOS A	0.6	4.3	0.47	0.27	0.50	37.6
2	T1	228	2.3	228	2.3	0.283	2.8	LOS A	0.6	4.3	0.47	0.27	0.50	23.7
Approach		351	1.8	351	1.8	0.283	4.5	NA	0.6	4.3	0.47	0.27	0.50	34.4
North: Rawson Street														
8	T1	334	7.3	334	7.3	0.301	3.0	LOS A	0.5	4.0	0.34	0.09	0.40	31.3
9	R2	44	2.4	44	2.4	0.301	13.8	LOS A	0.5	4.0	0.34	0.09	0.40	38.1
Approach		378	6.7	378	6.7	0.301	4.3	NA	0.5	4.0	0.34	0.09	0.40	34.0
West: Site Acces														
10	L2	126	1.7	126	1.7	0.280	9.0	LOS A	0.5	3.6	0.68	0.87	0.77	32.9
12	R2	33	0.0	33	0.0	0.280	14.3	LOS A	0.5	3.6	0.68	0.87	0.77	32.9
Approach		159	1.3	159	1.3	0.280	10.1	LOS A	0.5	3.6	0.68	0.87	0.77	32.9
All Vehicles		887	3.8	887	3.8	0.301	5.4	NA	0.6	4.3	0.45	0.30	0.51	33.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 101v [XM. Rawson St PM - Pedestrian Operated Signals (Site Folder: 4 - Background Growth with Development)]

Network: N101 [Sc. 4 PM - with POS mitigation (Network Folder: Scenario 4 BG & Pdev)]

New Site
Site Category: (None)
Pedestrian Crossing (Signalised) - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 40 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson Street														
2	T1	474	0.0	474	0.0	* 0.566	9.7	LOS A	4.4	31.1	0.81	0.70	0.81	28.6
Approach		474	0.0	474	0.0	0.566	9.7	LOS A	4.4	31.1	0.81	0.70	0.81	28.6
North: Rawson Street														
8	T1	361	4.4	361	4.4	0.443	9.1	LOS A	3.2	22.9	0.75	0.64	0.75	15.2
Approach		361	4.4	361	4.4	0.443	9.1	LOS A	3.2	22.9	0.75	0.64	0.75	15.2
All Vehicles		835	1.9	834 N1	1.9	0.566	9.4	LOS A	4.4	31.1	0.78	0.67	0.78	24.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Rawson Street											
P1	Full	1047	15.1	LOS B	1.1	1.1	0.89	0.89	175.9	209.0	1.19
All Pedestrians		1047	15.1	LOS B	1.1	1.1	0.89	0.89	175.9	209.0	1.19

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 706 [1. Beecroft Rd/ Carlingford Rd PM (Site Folder: 4 - Background Growth with Development)]

Network: N101 [Sc. 4 PM - with POS mitigation (Network Folder: Scenario 4 BG & Pdev)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Beecroft Road														
1	L2	939	4.3	920	4.3	0.619	13.2	LOS A	9.0	65.5	0.49	0.73	0.49	39.3
2	T1	1317	1.4	1290	1.4	* 0.991	86.4	LOS F	42.2	299.1	0.95	1.21	1.40	23.2
Approach		2256	2.6	2209 N1	2.6	0.991	55.9	LOS D	42.2	299.1	0.76	1.01	1.02	25.8
North: Beecroft Road														
8	T1	757	1.6	757	1.6	0.196	14.2	LOS A	4.6	32.8	0.52	0.44	0.52	41.1
9	R2	309	5.4	309	5.4	* 1.015	128.1	LOS F	9.2	67.7	1.00	1.17	1.85	11.6
Approach		1066	2.7	1066	2.7	1.015	47.3	LOS D	9.2	67.7	0.66	0.65	0.90	23.7
West: Carlingford Road														
10	L2	97	4.3	97	4.3	0.955	77.9	LOS F	7.0	50.0	1.00	1.13	1.27	18.2
12	R2	1079	1.4	1079	1.4	* 0.955	75.5	LOS F	7.1	50.0	1.00	1.07	1.28	3.2
Approach		1176	1.6	1176	1.6	0.955	75.7	LOS F	7.1	50.0	1.00	1.08	1.28	4.9
All Vehicles		4498	2.4	4452 N1	2.4	1.015	59.1	LOS E	42.2	299.1	0.80	0.94	1.06	20.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Beecroft Road											
P1B	Slip/ Bypass	53	59.3	LOS E	0.2	0.2	0.96	0.96	81.8	27.0	0.33
West: Carlingford Road											
P4	Full	7	59.2	LOS E	0.0	0.0	0.95	0.95	88.3	35.0	0.40
All Pedestrians		60	59.3	LOS E	0.2	0.2	0.96	0.96	82.6	28.0	0.34

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 1015 [2. Carlingford Rd/ Ray Rd/ Rawson St PM (Site Folder: 4 - Background Growth with Development)]

Network: N101 [Sc. 4 PM - with POS mitigation (Network Folder: Scenario 4 BG & Pdev)]

NRT 6AM - 10AM, 3PM - 7PM
N Leg Parking Restrictions AM
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson St														
1	L2	131	0.8	131	0.8	0.400	37.6	LOS C	7.9	55.8	0.80	0.73	0.80	8.9
2	T1	163	0.0	163	0.0	* 0.890	37.5	LOS C	8.3	58.0	0.82	0.77	0.86	26.1
3	R2	152	0.0	152	0.0	0.890	79.6	LOS F	8.3	58.0	1.00	1.08	1.43	4.3
Approach		446	0.2	446	0.2	0.890	51.9	LOS D	8.3	58.0	0.87	0.86	1.04	14.3
East: Carlingford Rd														
4	L2	177	6.0	174	6.0	0.668	29.8	LOS C	6.9	50.0	0.84	0.79	0.84	7.6
5	T1	1062	4.0	1047	4.0	0.668	27.3	LOS B	6.9	50.0	0.86	0.79	0.86	7.4
6	R2	4	100.0	4	100.0	0.668	32.3	LOS C	6.9	50.0	0.87	0.79	0.87	28.8
Approach		1243	4.6	1226 N1	4.6	0.668	27.7	LOS B	6.9	50.0	0.86	0.79	0.86	7.6
North: Ray Rd														
7	L2	145	0.7	145	0.7	0.439	39.1	LOS C	5.6	39.4	0.81	0.79	0.81	24.4
8	T1	122	3.5	122	3.5	0.254	33.3	LOS C	4.0	29.0	0.77	0.65	0.77	26.1
9	R2	22	4.8	22	4.8	0.254	37.9	LOS C	4.0	29.0	0.77	0.65	0.77	26.1
Approach		289	2.2	289	2.2	0.439	36.6	LOS C	5.6	39.4	0.79	0.72	0.79	25.2
West: Carlingford Rd														
10	L2	40	0.0	40	0.0	* 0.883	55.1	LOS D	19.6	139.8	0.96	1.04	1.17	35.6
11	T1	818	2.2	818	2.2	0.883	50.6	LOS D	19.6	139.8	0.96	1.04	1.18	30.5
12	R2	2	100.0	2	100.0	0.883	58.0	LOS E	18.1	129.9	0.96	1.05	1.20	30.2
Approach		860	2.3	860	2.3	0.883	50.8	LOS D	19.6	139.8	0.96	1.04	1.18	30.8
All Vehicles		2838	3.0	2820 N1	3.0	0.890	39.5	LOS C	19.6	139.8	0.88	0.87	0.98	22.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Rawson St											
P1	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	87.8	34.2	0.39
East: Carlingford Rd											

P2 Full	105	59.4	LOS E	0.4	0.4	0.96	0.96	88.4	34.8	0.39
North: Ray Rd										
P3 Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	87.1	33.4	0.38
West: Carlingford Rd										
P4 Full	211	59.7	LOS E	0.7	0.7	0.96	0.96	88.7	34.8	0.39
All Pedestrians	421	59.5	LOS E	0.7	0.7	0.96	0.96	88.3	34.6	0.39

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 3 [3. Rawson St/ Bridge St PM (Site Folder: 4 - Background Growth with Development)]

Network: N101 [Sc. 4 PM - with POS mitigation (Network Folder: Scenario 4 BG & Pdev)]

Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson Street														
1	L2	28	0.0	28	0.0	0.538	17.3	LOS B	1.6	11.1	0.88	1.04	1.13	39.7
2	T1	93	0.0	93	0.0	0.538	17.2	LOS B	1.6	11.1	0.88	1.04	1.13	33.6
3	R2	67	0.0	67	0.0	0.538	21.0	LOS B	1.6	11.1	0.88	1.04	1.13	25.7
3u	U	6	0.0	6	0.0	0.538	23.9	LOS B	1.6	11.1	0.88	1.04	1.13	42.8
Approach		195	0.0	195	0.0	0.538	18.7	LOS B	1.6	11.1	0.88	1.04	1.13	31.8
East: Bridge Street														
4	L2	42	0.0	42	0.0	0.845	23.3	LOS B	5.9	41.3	1.00	1.24	1.62	31.9
5	T1	282	0.4	282	0.4	0.845	23.2	LOS B	5.9	41.3	1.00	1.24	1.62	32.6
6	R2	157	0.0	157	0.0	0.845	26.7	LOS B	5.9	41.3	1.00	1.24	1.62	12.8
6u	U	2	0.0	2	0.0	0.845	28.3	LOS B	5.9	41.3	1.00	1.24	1.62	10.3
Approach		483	0.2	483	0.2	0.845	24.3	LOS B	5.9	41.3	1.00	1.24	1.62	28.7
North: Rawson Street														
7	L2	52	16.3	52	16.3	0.496	6.6	LOS A	1.2	9.1	0.44	0.64	0.44	34.6
8	T1	124	0.8	124	0.8	0.496	6.0	LOS A	1.2	9.1	0.44	0.64	0.44	43.6
9	R2	136	4.7	136	4.7	0.496	9.6	LOS A	1.2	9.1	0.44	0.64	0.44	43.6
9u	U	49	0.0	49	0.0	0.496	11.0	LOS A	1.2	9.1	0.44	0.64	0.44	32.1
Approach		361	4.4	361	4.4	0.496	8.1	LOS A	1.2	9.1	0.44	0.64	0.44	42.1
West: Bridge Street														
10	L2	175	0.0	175	0.0	0.483	10.2	LOS A	1.3	9.3	0.74	0.87	0.83	38.9
11	T1	53	2.0	53	2.0	0.483	10.4	LOS A	1.3	9.3	0.74	0.87	0.83	40.7
12	R2	14	0.0	14	0.0	0.483	14.0	LOS A	1.3	9.3	0.74	0.87	0.83	43.9
12u	U	9	0.0	9	0.0	0.483	15.6	LOS B	1.3	9.3	0.74	0.87	0.83	44.5
Approach		251	0.4	251	0.4	0.483	10.7	LOS A	1.3	9.3	0.74	0.87	0.83	40.0
All Vehicles		1289	1.4	1289	1.4	0.845	16.3	LOS B	5.9	41.3	0.78	0.97	1.06	34.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 216 [4. Blaxland Rd/ Epping Rd - PM (Site Folder: 4 - Background Growth with Development)]

Network: N101 [Sc. 4 PM - with POS mitigation (Network Folder: Scenario 4 BG & Pdev)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Blaxland Rd														
21a	L1	977	0.9	977	0.9	* 1.023	120.8	LOS F	36.8	259.5	1.00	1.20	1.66	12.1
22	T1	114	2.8	114	2.8	0.548	58.5	LOS E	4.2	30.4	0.98	0.79	0.98	29.1
Approach		1091	1.1	1091	1.1	1.023	114.3	LOS F	36.8	259.5	1.00	1.16	1.59	13.6
East: Epping Rd														
4b	L3	13	0.0	13	0.0	0.019	30.6	LOS C	0.3	2.0	0.62	0.68	0.62	39.5
5	T1	1618	2.4	1618	2.4	* 1.010	95.0	LOS F	53.7	385.1	1.00	1.31	1.49	14.7
Approach		1631	2.4	1631	2.4	1.010	94.5	LOS F	53.7	385.1	1.00	1.30	1.48	14.8
NorthWest: Langston Pl														
27a	L1	32	3.3	32	3.3	0.477	64.4	LOS E	3.4	24.4	0.98	0.77	0.98	27.9
28	T1	189	2.8	189	2.8	0.477	57.4	LOS E	4.8	34.2	0.97	0.77	0.97	29.4
Approach		221	2.9	221	2.9	0.477	58.4	LOS E	4.8	34.2	0.97	0.77	0.97	29.2
West: Epping Rd														
10b	L3	445	1.2	445	1.2	0.542	8.7	LOS A	2.9	20.8	0.17	0.51	0.17	49.9
11	T1	1103	1.9	1103	1.9	0.542	2.7	LOS A	5.6	39.3	0.18	0.25	0.18	56.2
12a	R1	322	0.7	322	0.7	1.011	77.1	LOS F	13.2	93.2	1.00	1.10	1.57	19.9
Approach		1871	1.5	1871	1.5	1.011	16.9	LOS B	13.2	93.2	0.32	0.46	0.42	41.8
All Vehicles		4813	1.8	4813	1.8	1.023	67.2	LOS E	53.7	385.1	0.73	0.92	1.07	22.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: Blaxland Rd											
P5	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	226.5	217.4	0.96
East: Epping Rd											
P2	Full	168	59.6	LOS E	0.6	0.6	0.96	0.96	227.6	218.4	0.96
NorthWest: Langston Pl											
P7	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	222.7	212.5	0.95
All Pedestrians		274	59.4	LOS E	0.6	0.6	0.96	0.96	226.4	217.1	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 1068 [5. Midson Rd/ Carlingford Rd - PM (Site Folder: 4 - Background Growth with Development)]

Network: N101 [Sc. 4 PM - with POS mitigation (Network Folder: Scenario 4 BG & Pdev)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Midson Rd														
1	L2	118	2.7	118	2.7	0.576	42.8	LOS D	8.1	57.6	0.92	0.80	0.92	33.5
2	T1	408	0.3	408	0.3	* 0.960	59.4	LOS E	18.4	130.7	0.97	1.04	1.26	27.2
3	R2	177	4.2	177	4.2	0.960	78.4	LOS F	18.4	130.7	1.00	1.20	1.49	16.5
Approach		703	1.6	703	1.6	0.960	61.4	LOS E	18.4	130.7	0.97	1.04	1.26	25.7
East: Carlingford Rd														
4	L2	74	1.4	73	1.4	1.000	97.6	LOS F	25.8	186.4	1.00	1.35	1.63	27.2
5	T1	918	4.2	912	4.2	* 1.000	92.7	LOS F	25.8	186.4	1.00	1.34	1.64	28.2
6	R2	186	0.0	185	0.0	0.534	28.9	LOS C	3.8	26.7	0.90	0.80	0.90	41.9
Approach		1178	3.4	1170 N1	3.4	1.000	82.9	LOS F	25.8	186.4	0.98	1.26	1.52	29.7
North: Midson Rd														
7	L2	39	2.7	39	2.7	0.557	50.9	LOS D	3.7	26.4	0.99	0.83	0.99	21.9
8	T1	262	1.6	262	1.6	* 0.929	61.5	LOS E	8.8	62.5	1.00	1.03	1.32	27.0
9	R2	49	0.0	49	0.0	0.929	74.1	LOS F	8.8	62.5	1.00	1.13	1.50	26.2
Approach		351	1.5	351	1.5	0.929	62.1	LOS E	8.8	62.5	0.99	1.02	1.31	26.5
West: Carlingford Rd														
10	L2	42	0.0	42	0.0	0.638	42.3	LOS C	9.9	70.4	0.93	0.80	0.93	34.8
11	T1	649	2.4	649	2.4	0.638	36.8	LOS C	10.1	71.8	0.93	0.80	0.93	27.3
12	R2	218	0.5	218	0.5	* 0.765	36.8	LOS C	5.0	35.0	1.00	0.86	1.13	35.0
Approach		909	1.9	909	1.9	0.765	37.0	LOS C	10.1	71.8	0.95	0.82	0.98	30.2
All Vehicles		3141	2.3	3133 N1	2.4	1.000	62.4	LOS E	25.8	186.4	0.97	1.05	1.28	28.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Midson Rd											
P1	Full	53	49.3	LOS E	0.2	0.2	0.95	0.95	215.7	216.4	1.00
East: Carlingford Rd											
P2	Full	53	49.3	LOS E	0.2	0.2	0.95	0.95	215.7	216.4	1.00
North: Midson Rd											

P3 Full	53	49.3	LOS E	0.2	0.2	0.95	0.95	212.2	211.8	1.00
All Pedestrians	158	49.3	LOS E	0.2	0.2	0.95	0.95	214.6	214.9	1.00

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 101vv [6. Site Access PM (Site Folder: 4 - Background Growth with Development)]

Network: N101 [Sc. 4 PM - with POS mitigation (Network Folder: Scenario 4 BG & Pdev)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rawson Street														
1	L2	202	0.0	202	0.0	0.425	9.7	LOS A	1.1	8.0	0.66	0.45	0.85	35.7
2	T1	212	3.0	212	3.0	0.425	5.3	LOS A	1.1	8.0	0.66	0.45	0.85	17.9
Approach		414	1.5	414	1.5	0.425	7.4	NA	1.1	8.0	0.66	0.45	0.85	32.5
North: Rawson Street														
8	T1	217	11.7	216	11.7	0.346	10.4	LOS A	1.2	8.7	0.76	0.30	0.95	18.0
9	R2	88	0.0	88	0.0	0.346	18.5	LOS B	1.2	8.7	0.76	0.30	0.95	33.1
Approach		305	8.3	304 N1	8.3	0.346	12.8	NA	1.2	8.7	0.76	0.30	0.95	26.6
West: Site Acces														
10	L2	249	0.0	249	0.0	0.579	14.6	LOS B	1.5	10.7	0.80	1.15	1.41	30.0
12	R2	48	0.0	48	0.0	0.579	19.9	LOS B	1.5	10.7	0.80	1.15	1.41	30.0
Approach		298	0.0	298	0.0	0.579	15.5	LOS B	1.5	10.7	0.80	1.15	1.41	30.0
All Vehicles		1017	3.1	1015 N1	3.1	0.579	11.4	NA	1.5	10.7	0.73	0.61	1.04	30.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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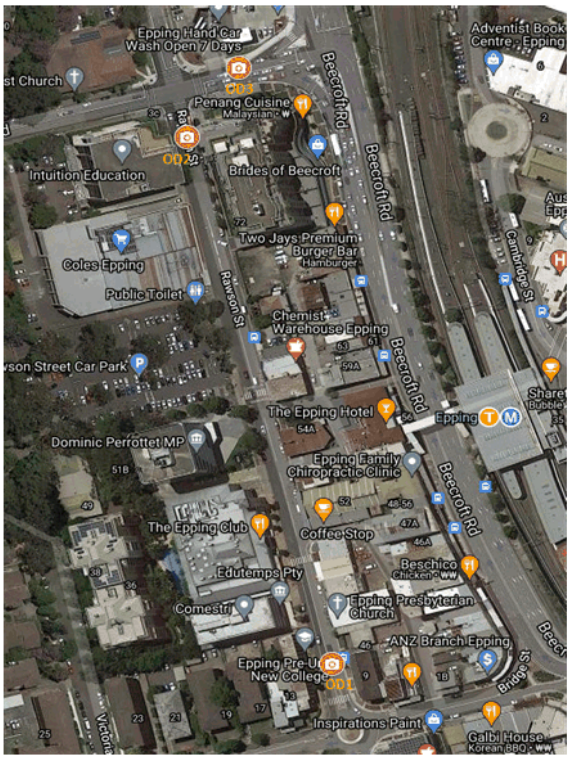
Appendix F. Origin Destination Surveys



MATRIX
Traffic and Transport Data

[Location]
OD1. Rawson St immediately after rounadabout - Northbound
OD2. Rawson St south of Carlingford Rd - Northbound
OD3. Carlingford Rd between Rawson St and Beecroft Rd - Eastbound

AUNSW1021 - Epping - OD

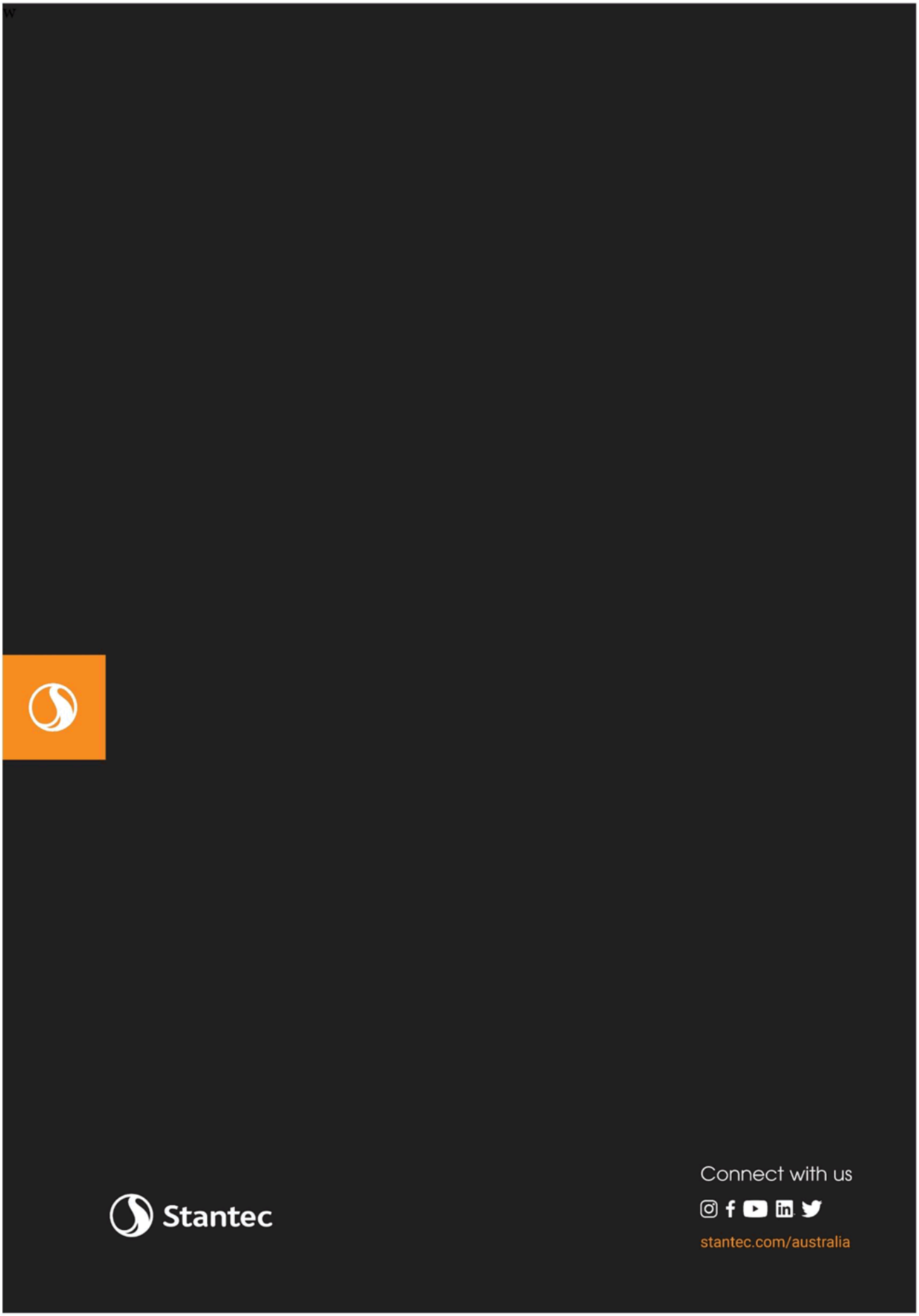
Date 24/06/2021
Start Time 6:30 **End Time** 09:30
Match Time 15 minutes

Time Period	Match from OD1 to OD3			Match from OD2 to OD3			(OD1 to OD3) / (OD2 to OD3)
	Light	Heavy	Total	Light	Heavy	Total	
6:30 - 6:45	5	0	5	5	1	6	83.3%
6:45 - 7:00	8	0	8	9	0	9	88.9%
7:00 - 7:15	8	1	9	11	2	13	69.2%
7:15 - 7:30	13	0	13	16	0	16	81.3%
7:30 - 7:45	10	2	12	14	2	16	75.0%
7:45 - 8:00	4	0	4	10	0	10	40.0%
8:00 - 8:15	9	0	9	14	0	14	64.3%
8:15 - 8:30	11	1	12	14	1	15	80.0%
8:30 - 8:45	17	1	18	21	1	22	81.8%
8:45 - 9:00	16	0	16	27	0	27	59.3%
9:00 - 9:15	12	0	12	16	0	16	75.0%
9:15 - 9:30	14	1	15	21	3	24	62.5%
Total	**127**	**6**	133	**178**	**10**	**188**	**70.7%**

AUNSW1021 - Epping - OD

Date 24/06/2021
Start Time 15:00 **End Time** 19:00
Match Time 15 minutes

Time Period	Match from OD1 to OD3			Match from OD2 to OD3			(OD1 to OD3) / (OD2 to OD3)
	Light	Heavy	Total	Light	Heavy	Total	
15:00 - 15:15	13	1	14	34	1	35	40.0%
15:15 - 15:30	12	1	13	23	1	24	54.2%
15:30 - 15:45	8	0	8	32	0	32	25.0%
15:45 - 16:00	12	1	13	31	1	32	40.6%
16:00 - 16:15	13	0	13	41	0	41	31.7%
16:15 - 16:30	14	0	14	33	0	33	42.4%
16:30 - 16:45	11	0	11	24	1	25	44.0%
16:45 - 17:00	12	0	12	29	0	29	41.4%
17:00 - 17:15	14	0	14	33	0	33	42.4%
17:15 - 17:30	18	0	18	38	1	39	46.2%
17:30 - 17:45	9	0	9	35	0	35	25.7%
17:45 - 18:00	10	0	10	22	0	22	45.5%
18:00 - 18:15	10	0	10	27	0	27	37.0%
18:15 - 18:30	13	0	13	33	0	33	39.4%
18:30 - 18:45	13	0	13	31	0	31	41.9%
18:45 - 19:00	14	0	14	39	0	39	35.9%
Total	**196**	**3**	199	**505**	**5**	**510**	**39.0%**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Social Impact Assessment - 2024 Addendum

53-61 Rawson Street, Epping

Cred CONSULTING

Purpose of the Addendum

Cred Consulting prepared a Social Impact Assessment (SIA) for a planning proposal of a mixed-use development at 53-61 Rawson Street, Epping, in the City of Parramatta Local Government Area (LGA) in August 2023 (2023 report).

Since then, some changes have been made to the planning proposal. This Addendum evaluates whether these changes alter or add to the impacts identified in the 2023 report.

About the changes

The main modification to the planning proposal is that the original plan for three residential towers has been reduced to two. Despite this reduction in the number of towers, the GFA and the total number of apartments remain unchanged.

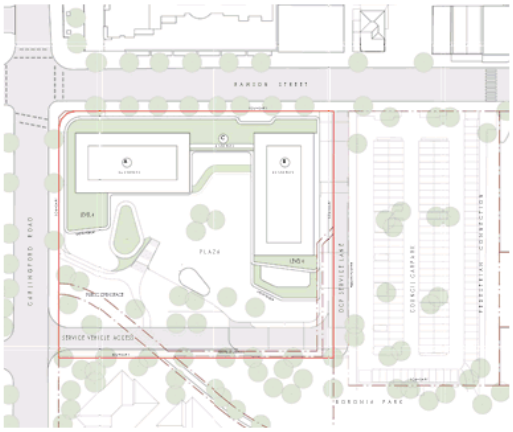
However, the notable difference, as indicated in Table 1, is an increase in commercial floor space by an additional 4,544 sqm, primarily intended for office use.

Additionally, the public open space has increased from 4,244 sqm to 4,600 sqm. However, the communal open space has reduced marginally from 2,070 sqm to 1,937 sqm.

Table 1 - Changes in the revised planning proposal scheme (source: Oakstand)

	PP Scheme Feb 24	Revised Scheme - 2 Tower Scheme
Land Area	9,089	9,089
Non-Residential Floor Space		
Supermarket	3,100	3,100
LG Specialty Retail	1,330	990
G Retail	2,243	2,157
Subtotal Specialty Retail		*3,147*
Commercial Office - Level 1	2,757	2,670
Commercial Office - Level 2	-	2,380
Commercial Office - Level 3	-	2,380
Subtotal Commercial Office		*7,430*
Non- Residential FSR	**1:1**	**1.5**
Residential FSR	**4.5:1**	**4.5:1**
No. apartments	420	up to 420
Total FSR	**5.5:1**	**6:1**

Figure 1 - Masterplan (source: Oakstand)



Impacts identified in the 2023 report remain valid

In late 2023, the City of Parramatta released its draft Economic Development Strategy for 2023-2033. This strategy outlines the strategic role of Epping, both in its current context and its projected future.

Current role

Epping is currently a strategic local center serving a rapidly growing population, with strong public transport connections.

Future role

Epping is set to become a major employment and business hub, leveraging enhanced transport links to Parramatta's CBD and its proximity to the Macquarie Park Innovation District.

The recent changes to the planning proposal align with Council's strategic goals for the area, which adds another positive social impact to the development. Additionally, all other social impacts, enhancement suggestions, and mitigation measures identified in the 2023 report remain valid.

Overall, the social impact assessment for the planning proposal remains overwhelmingly positive and is supported.

For more detailed information, please refer to the 2023 report.

Figure 2 - Ground level plan (source: Oakstand)

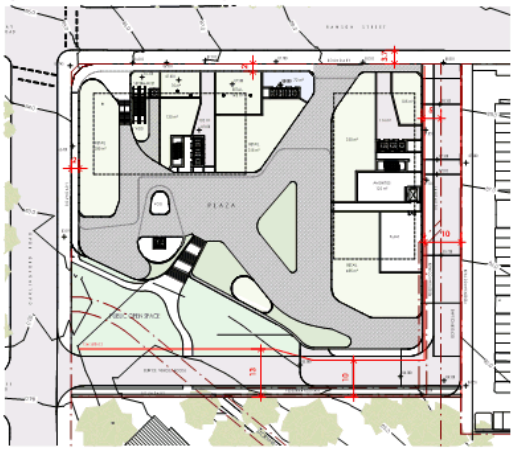


Figure 3 - Level 1 plan (source: Oakstand)

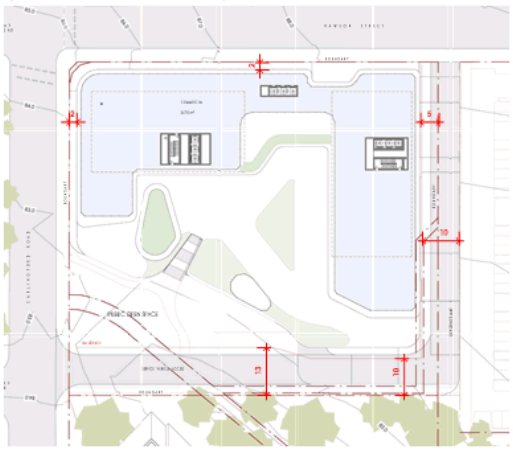
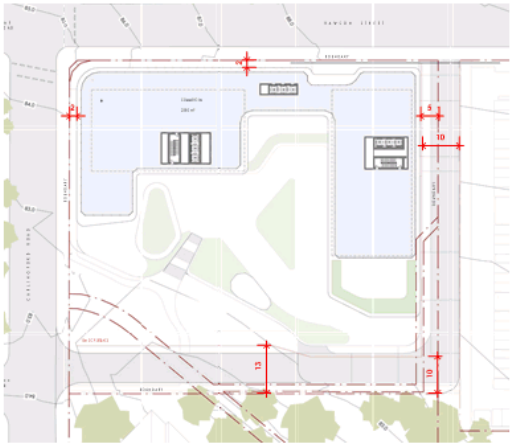


Figure 4 - Level 2-3 plan (source: Oakstand)



WINDTECH

PEDESTRIAN WIND ENVIRONMENT STATEMENT

EPPING TOWN CENTRE, EPPING

WG203-04F03(REV3)- WS REPORT

APRIL 29, 2024

Prepared for:

Canjs Pty LTD

c/o- Oakstand Property Group
Level 9, 503-505 Kent Street
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30 YEARS OF EXCELLENCE IN WIND ENGINEERING

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DOCUMENT CONTROL

Date	Revision History	Issued Revision	Prepared By (initials)	Instructed By (initials)	Reviewed & Authorised by (initials)
June 21, 2023	Update of previous report (WG203-01F02(rev0), dated October 13, 2021) to include updated drawings and treatments	0	RL	SWR	EV
June 27, 2023	Treatments and minor text updates.	1	RL	SWR	EV
July 26, 2023	Minor text updates.	2	EV	SWR	EV/GC
April 29, 2024	Tower Scheme update.	3	SG	SWR	SL
April 29, 2024	Cover Image update.	4	SG	SWR	SL

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EXECUTIVE SUMMARY

This report presents an opinion on the likely impact of the Epping Town Centre, located in Epping, on the local wind environment at the critical outdoor areas within and around the subject site. The effect of wind activity has been examined for the three predominant wind directions for the region, namely the north-east, south to south-east, and westerly winds. The analysis of the wind effects relating to the proposed development have been carried out in the context of the local wind climate, building morphology and land topography. This report has been prepared to support a planning proposal and addresses the impact of the proposed increase in building height control on the subject site and the surrounding environment.

The conclusions of this report are drawn from our extensive experience in this field and are based on an examination of the latest architectural drawings. No wind tunnel testing has been undertaken for the subject development, and hence this report addresses only the general wind effects and any localised effects that are identifiable by visual inspection of the architectural drawings (received April 18, 2024) provided. Any recommendations in this report are made only in-principle and are based on our extensive experience in the study of wind environment effects.

The results of this assessment indicate that the development has incorporated several design features and wind mitigating strategies however, there are some areas that are likely to be exposed to stronger winds. It is expected that the wind effects identified in the report can be ameliorated with the consideration of the following treatment strategies into the design of the development:

- Ground level trafficable areas:
    - Retain proposed north-western landscape area with densely foliating tree and hedge planting within.
    - Inclusion of continuous impermeable awning along Rawson Street frontage on Ground level.
    - Inclusion of an impermeable awning at the base of Tower B along the southern aspect on Ground level.
    - Inclusion of an impermeable awning at the base of Tower A along the western aspect on Ground level.
    - Retain proposed landscape areas with densely foliating tree and hedge planting within the central communal open space on Level 1 and at the entrances into the area.
    - Inclusion of a combination of densely foliating evergreen planting, baffle screening along the arcade entrances to the central open communal open space on the Ground Level.
- Elevated Communal Open Spaces:
    - Retain proposed landscape areas with densely foliating tree and hedge planting within.
    - Inclusion of a perimeter screening to a height of 2-2.5m high in between Towers A and B on Level 4.

- Private balconies and terraces:
    - Full height impermeable screens or full height louvres along one of the exposed aspects of the corner balconies i.e., single aspect design.

The development of the potential future buildings to the north-east and south-south-east of the site is expected to provide significant shielding of the trafficable areas within the development from the prevailing north-east and south-south-east winds.

With the consideration of the above treatment strategies for the final design, it is expected that the proposed development will be able to achieve suitable wind conditions for the various trafficable outdoor areas within and around the development for intended uses, and that the wind speeds will satisfy the applicable criteria for pedestrian comfort and safety. Quantitative wind tunnel testing is planned to be undertaken at a later detailed design stage to quantitatively assess the wind conditions and to verify the necessity of the treatments and optimise the size and extent of the recommendations as required.

CONTENTS

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2	Description of Development and Surroundings	2
3	Regional Wind	4
4	Wind Effects on People	5
5	Results and Discussion	6
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	5.2 Elevated Communal Open Spaces	10
	5.3 Private Balconies and Terraces	14
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6	References	15

Appendix A Wind Effects Glossary

1 INTRODUCTION

An opinion on the likely impact of the proposed design on the local wind environment affecting pedestrians within the critical outdoor areas within and around the subject development is presented in this report. The analysis of wind effects relating to the proposed development has been carried out in the context of the predominant wind directions for the region, building morphology of the development and nearby buildings, and local land topography. The conclusions of this report are drawn from our extensive experience in the field of wind engineering and studies of wind environment effects. This report has been prepared to support a planning proposal and addresses the impact of the proposed increase in building height control on the subject site and the surrounding environment.

No wind tunnel testing has been undertaken for this assessment. Hence this report addresses only the general wind effects and any localised effects that are identifiable by visual inspection, of the architectural drawings provided (received 18 April 2024 as shown in Table 1), and any recommendations in this report are made only in-principle.

Table 1: List of Architectural Drawings Referenced

Drawing Name	Drawing Number	Date
LOWER GROUND LEVEL PLAN	DA.104	18/04/2024
GROUND LEVEL PLAN	DA.105	18/04/2024
LEVEL 1 PLAN	DA.106	18/04/2024
LEVELS 2 – 3 PLANS	DA.107	18/04/2024
LEVEL 4 - TYPICAL	DA.108	18/04/2024
SECTION	DA.200A	18/04/2024

2 DESCRIPTION OF DEVELOPMENT AND SURROUNDINGS

The site is located at the corner of Carlingford Road and Rawson Street, Epping, and is bounded by Carlingford Road to the north, Rawson Street to the east, an open carpark to the south and low-rise residential buildings to the west. The site lies within the western end of the Epping CBD with a mid-rise residential building across Rawson Street to the east and mid to high rise residential buildings further to the east. Elsewhere surrounding the subject development are predominately low-rise residential and commercial buildings, with Boronia Park to the west and Epping train station to the east-south-east.

A survey of the land topography indicates slopes upwards to the east and west along Carlingford Road and south along Rawson Street of the site.

An aerial image of the subject site and the local surroundings is shown in Figure 1, with the frequency and magnitude of the prevailing winds is superimposed for each wind direction.

The existing site consists of an existing 5 storey high commercial building at 3 Carlingford Road and a 2 storey high Coles supermarket at 53 Rawson Street. The proposed development comprises of two towers, Towers A and B.

The critical outdoor trafficable areas associated with the proposed development, which are the focus of this assessment with regards to wind effects, are listed as follows:

- Ground Level areas and pedestrian footpath.
- Ground and Level 1, 2 and 4 Communal Open Spaces.
- Private balconies and terraces.

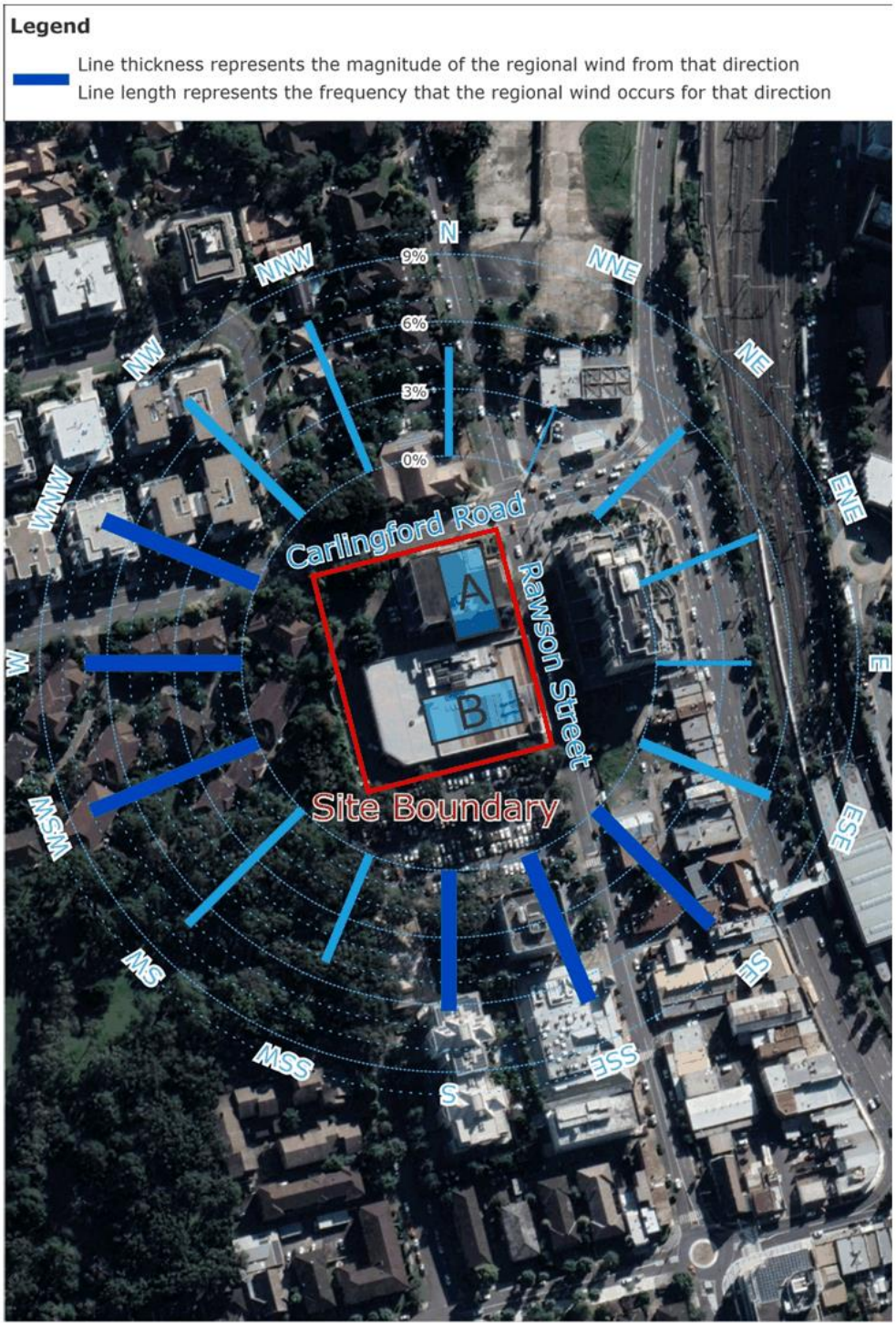

Figure 1: Aerial Image of the Site Location and Prevailing Wind Directions

3 REGIONAL WIND

The Epping region is governed by three principal wind directions that can potentially affect the subject development. These winds prevail from the north-east, south to south-east, and west. These wind directions were determined from an analysis undertaken by Windtech Consultants of recorded directional wind speeds obtained from the meteorological station located at Bankstown Airport by the Bureau of Meteorology (recorded from 1993 to 2016). The data has been corrected to represent winds over standard open terrain at a height of 10m above ground level. The results of this analysis are presented in Figure 2 in the form of a directional plot of the annual and 5% exceedance mean winds for the region. The frequency of occurrence of these winds is also shown in Figure 2.

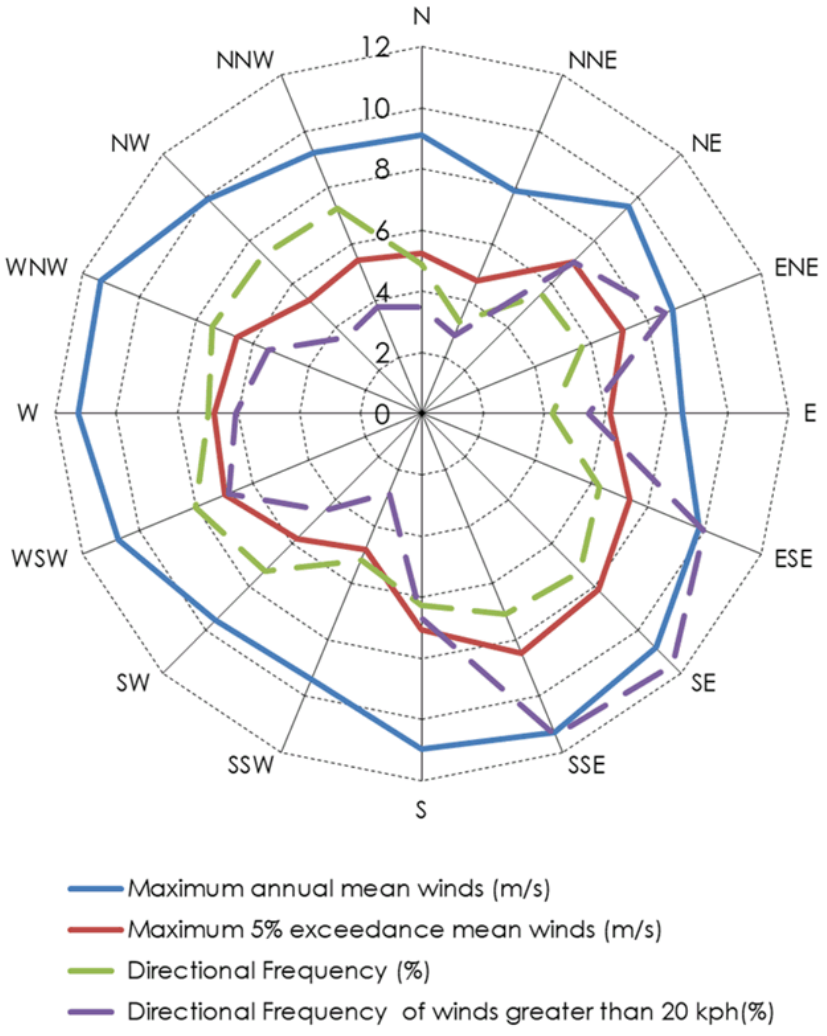

Figure 2: Directional Annual and 5% Exceedance Hourly Mean Wind Speeds (referenced to 10m height in standard open terrain), and Frequencies of Occurrence, for the Epping Region

4 WIND EFFECTS ON PEOPLE

The acceptability of wind in any area is dependent upon its use. For example, people walking, or window-shopping will tolerate higher wind speeds than those seated at an outdoor restaurant. Various other researchers, such as A.G. Davenport, T.V. Lawson, W.H. Melbourne, and A.D. Penwarden, have published criteria for pedestrian comfort for pedestrians in outdoor spaces for various types of activities. Some Councils and Local Government Authorities have adopted elements of some of these into their planning control requirements.

For example, A.D. Penwarden (1973) developed a modified version of the Beaufort scale which describes the effects of various wind intensities on people. Table 2 presents the modified Beaufort scale. Note that the effects listed in this table refers to wind conditions occurring frequently over the averaging time (a probability of occurrence exceeding 5%). Higher ranges of wind speeds can be tolerated for rarer events.

Table 2: Summary of Wind Effects on People (A.D. Penwarden, 1973)

Type of Winds	Beaufort Number	Mean Wind Speed (m/s)	Effects
Calm	0	Less than 0.3	Negligible.
Calm, light air	1	0.3 – 1.6	No noticeable wind.
Light breeze	2	1.6 – 3.4	Wind felt on face.
Gentle breeze	3	3.4 – 5.5	Hair is disturbed, clothing flaps, newspapers difficult to read.
Moderate breeze	4	5.5 – 8.0	Raises dust, dry soil and loose paper, hair disarranged.
Fresh breeze	5	8.0 – 10.8	Force of wind felt on body, danger of stumbling
Strong breeze	6	10.8 – 13.9	Umbrellas used with difficulty, hair blown straight, difficult to walk steadily, wind noise on ears unpleasant.
Near gale	7	13.9 – 17.2	Inconvenience felt when walking.
Gale	8	17.2 – 20.8	Generally impedes progress, difficulty balancing in gusts.
Strong gale	9	Greater than 20.8	People blown over.

It should be noted that wind speeds affecting this particular development can only be accurately quantified with a wind tunnel study. This assessment addresses only the general wind effects and any localised effects that are identifiable by visual inspection and the acceptability of the conditions for outdoor areas are determined based on their intended use. Any recommendations in this report are made only in-principle and are based on our extensive experience in the study of wind environment effects.

5 RESULTS AND DISCUSSION

The expected wind conditions affecting the development are discussed in the following sub-sections of this report for the various outdoor areas within and around the subject development. The interaction between the wind and the building morphology in the area is considered and important features taken into account including the distances between the surrounding buildings and the proposed building form, as well as the surrounding landform. Note that only the potentially critical wind effects are discussed in this report. A glossary of the different wind effects described in this report included in Appendix A.

For this assessment, the wind speed criteria for pedestrian comfort that are considered are listed as follows:

- Comfortable Walking Criterion (7.5m/s to 8m/s with a 5% probability of exceedance) for general circulation and pedestrian thoroughfares, e.g. footpaths, private balconies/terraces, through-site links etc.

- Short Exposure Criterion (5.5m/s to 6m/s with a 5% probability of exceedance) for stationary activities generally less than an hour, e.g. waiting areas, communal terraces, main entries, café seating etc.

Note that the lower end of the above ranges reflect the Davenport (1972) criteria and the upper end of these ranges reflect a modified Lawson (1975) criteria. Although this assessment is qualitative in nature, the abovementioned criteria for pedestrian comfort are considered when assessing the wind environment impacts. However, all areas are also assessed with consideration to a pedestrian safety criterion of 23m/s for the annual maximum gust.

5.1 Ground Level Areas

The pedestrian footpath along Carlingford Road is primarily exposed to the north-easterly and westerly prevailing winds. The strength of these winds flowing along Carlingford Road is expected to be reduced due to the setback of the Tower A from the podium along the northern aspect. The western aspect of Tower A is expected to cause some downwash flows from the prevailing westerly winds while the downwash from the northern aspect from north-easterly winds is deflected by the proposed setback of the tower along the Carlingford Road aspect. As a result, the wind conditions along Carlingford Road are expected to remain suitable and/or equivalent to the existing conditions. It is recommended to retain the Tower A setback along the Carlingford Street frontage.

The pedestrian footpath along Rawson Street is exposed to the north-easterly and south to south-easterly prevailing winds. Due to the open area to the south of Tower A and arcade entrances at the north-east of the site, the north-easterly winds are expected to flow directly across Rawson Street and into the connecting central communal area. The inclusion of Tower B is also expected to increase the strength of the north-easterly and south to south-easterly winds flowing along Rawson Street by increasing the funnelling effect. The prevailing south to south-easterly winds are also expected to impact the southern aspect of Tower B and downwash into the southern aspect pedestrian footpath. Downwash winds are also expected to impact the footpath along the Rawson Street frontage. It is recommended to include an impermeable awning along the southern aspect of Tower B and along the eastern podium at the ground level to deflect these down washed winds.

The arcade entrances into the central plaza are aligned to the prevailing wind directions and as such exposed to direct and funnelled winds. The western entrance into the central plaza area is exposed to the direct westerly winds. The proposed landscaped area at the north-western corner of the site on the lower ground level and the plaza at ground level is expected to assist in mitigating these winds as they flow towards the communal spaces and arcades. It is recommended to retain these proposed landscaping areas and to include densely foliating evergreen tree and hedge planting within them to slow winds flowing through the entrance and into the central communal area.

The north-eastern, and south-eastern arcade entrances are also similarly exposed to the direct prevailing north-easterly and south to south-easterly winds which are expected to flow directly through the entrances into the central plaza area creating adverse wind conditions within the entrances. Due to the height of the building form above and the alignment of these arcades, it is recommended to include a combination of densely foliating evergreen planting, baffle screening within the arcade to reduce the funnelling winds.

The central plaza area is exposed to direct winds and funnelling winds from the north-eastern, south-eastern, and western entrances leading into it. The abovementioned treatments recommended to mitigate the expected adverse winds within the arcades is also expected to assist the wind conditions at the central plaza area.

The abovementioned treatments are shown in Figures 3 and 4 below.

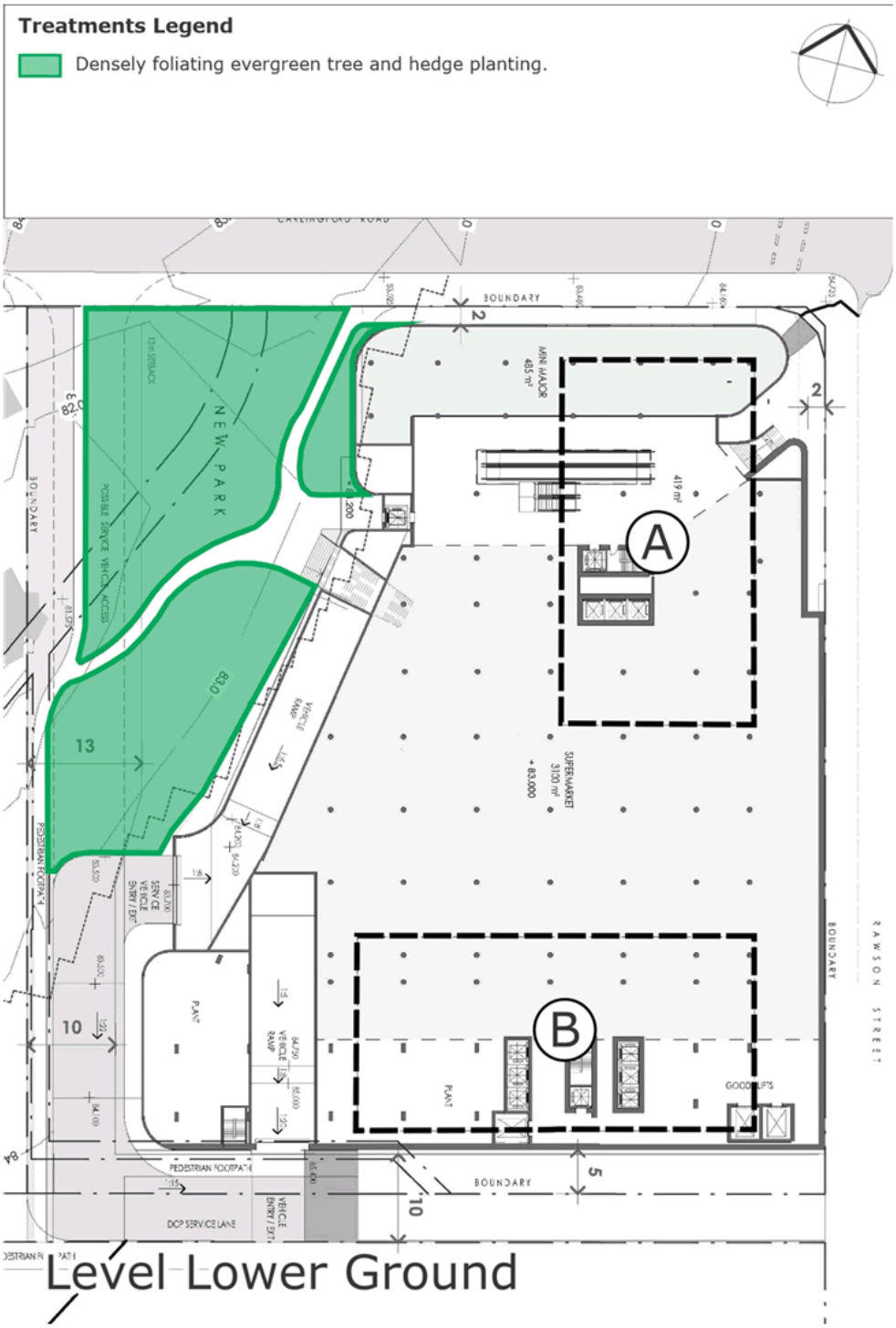

Figure 3: Recommended Treatment for the Lower Ground Level

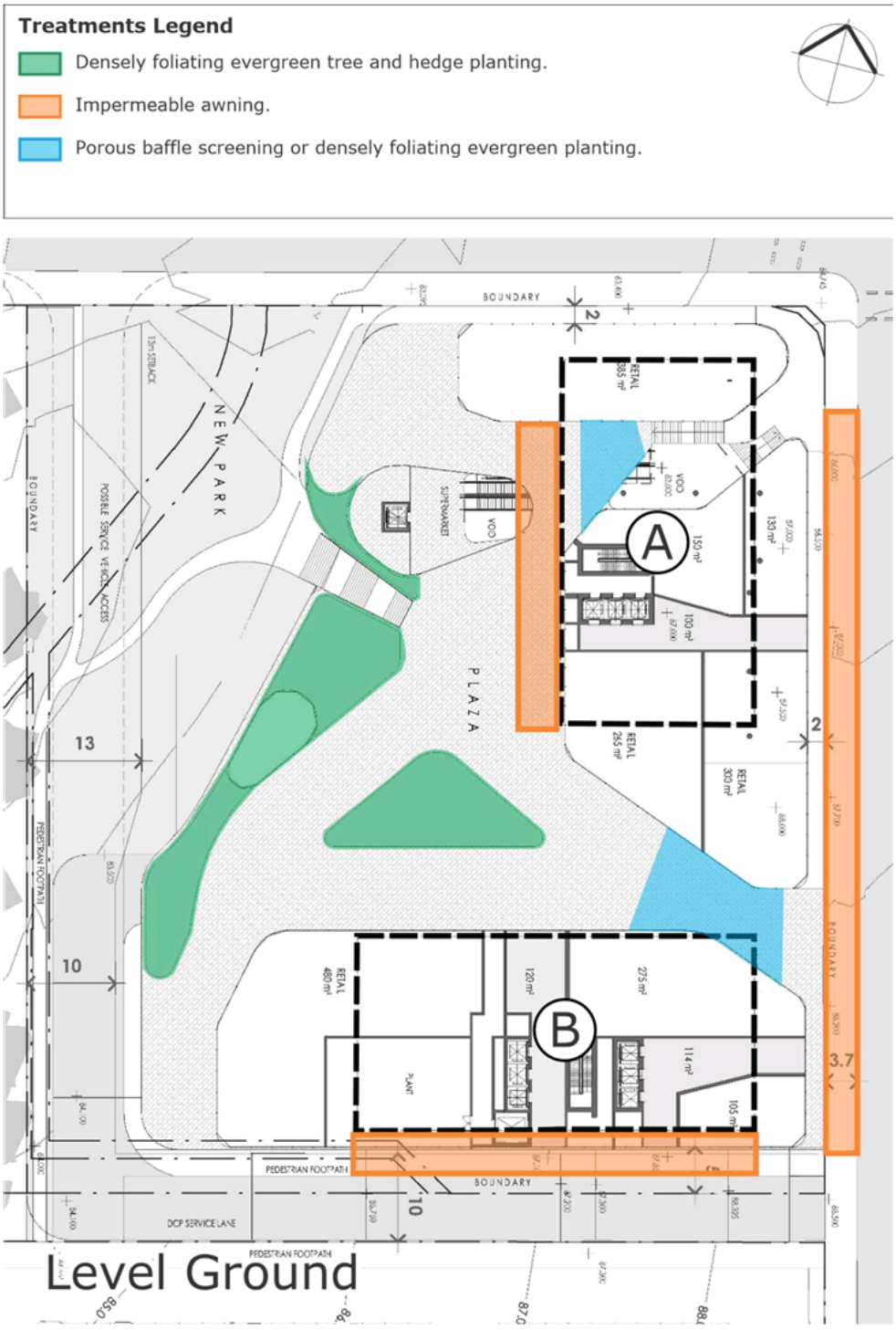

Figure 4: Recommended Treatment for Ground Level

5.2 Elevated Communal Open Spaces

The communal open spaces are located in between Tower A and B on Level 1, the westerns side of Tower B on Level 2 and the eastern aspect of the development on Level 4. These communal open spaces are exposed to direct prevailing winds, which are expected to funnel between the towers. The proposed landscaping within these areas is expected to assist in mitigating these wind effects however, the perimeter screening is minimal and the direct and funnelling winds are expected to flow over and through these spaces, notably in between Towers A and B on Level 4. It is recommended to retain the proposed landscaping areas and to include within these areas densely foliating evergreen tree and hedge planting to slow winds flowing through the area. Additionally, it is recommended to include a 2-2.5m high impermeable screen along the perimeter in between Towers A and B on Level 4 to deflect winds up and over this open spaces.

For the proposed landscaping to be effective as a wind mitigation device, they should be of a densely foliating variety. The planting should be spaced such that the foliage is able to interlock between plants (where possible) to ensure its effectiveness during stronger winds. The abovementioned treatments are shown in Figures 5, 6 and 7 below.

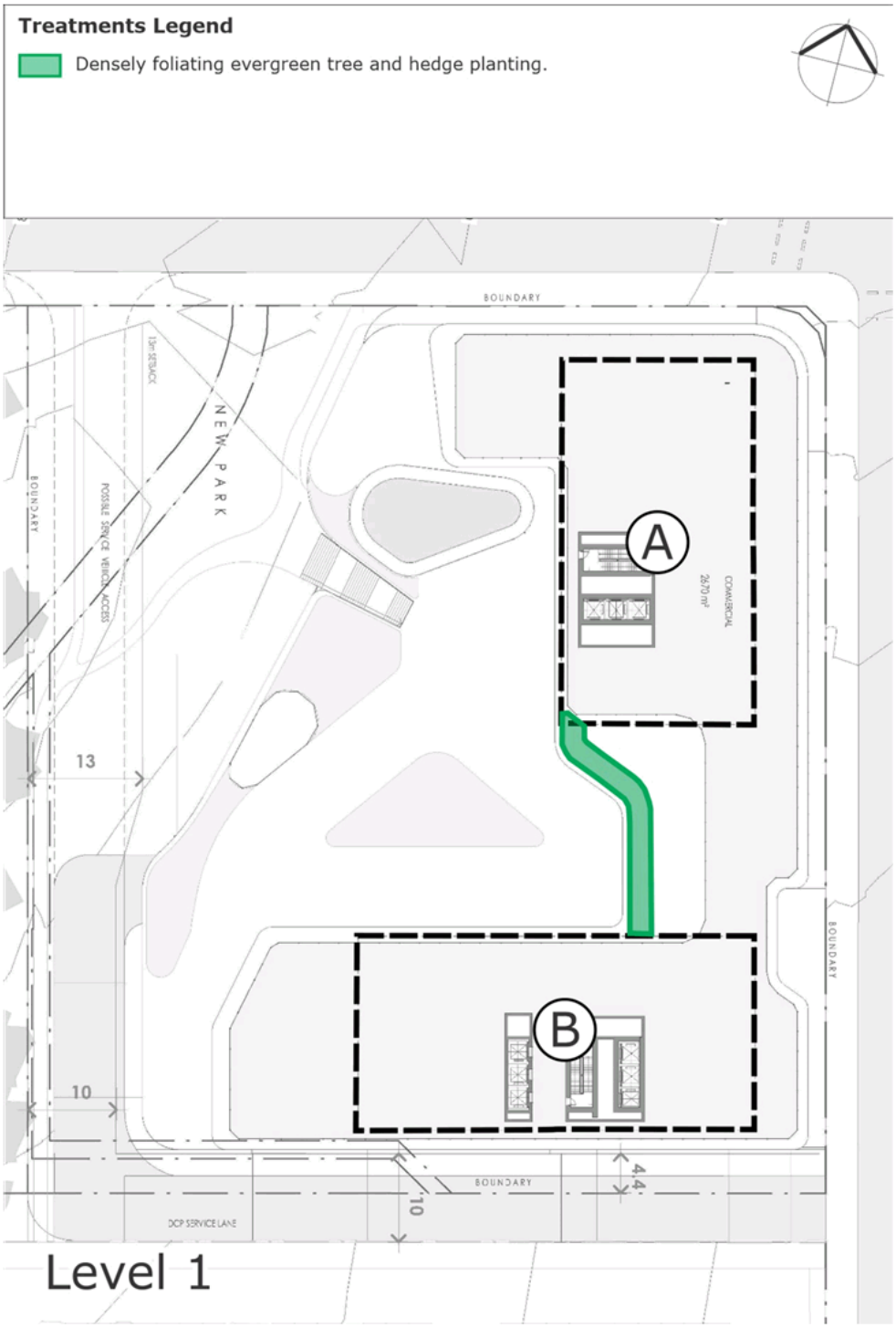

Figure 5: Recommended Treatment for Level 1

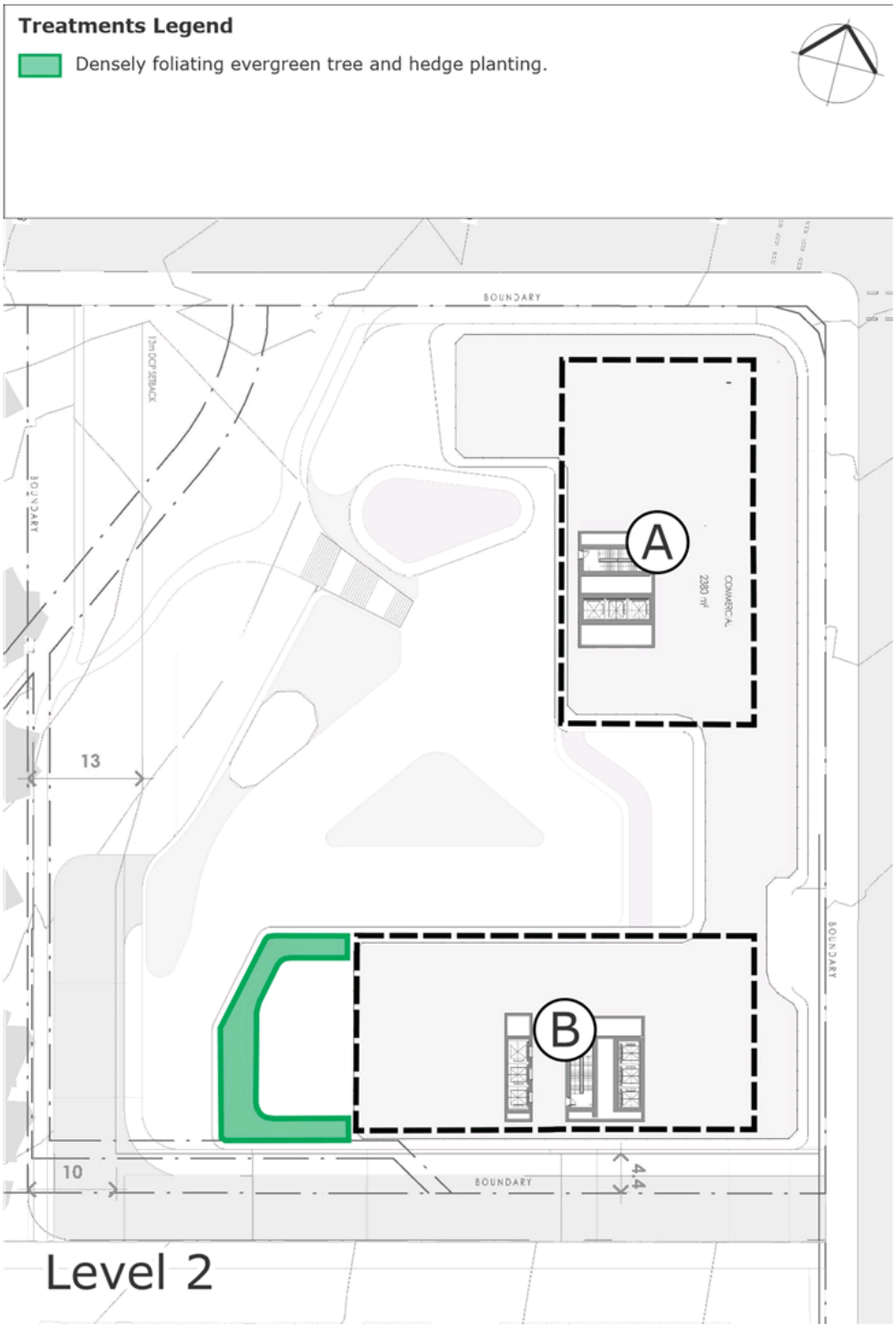

Figure 6: Recommended Treatment for Level 2

Figure 7: Recommended Treatment for Level 4

5.3 Private Balconies and Terraces

The majority of the private balconies residential towers within the development are expected to be suitable for their intended use due to their overall recessed design and inclusion of impermeable balustrades. These features should be retained in the final design. The balconies located on the corners of the towers however are exposed to corner accelerated flows from side streaming winds along the adjacent façade aspects and direct winds due to the lack of shielding provided by upstream buildings. To mitigate the corner effects, it is recommended to include full height impermeable screens or full height louvres along one of the exposed aspects of the balcony to deflect and stagnate flows that have the potential to corner accelerate. This feature aims to convert the balcony into a single aspect design, beneficial for wind mitigation purposes.

With the inclusion of the abovementioned recommendations in the final design, it is expected that wind conditions for the various trafficable outdoor areas within and around the development will be suitable for their intended uses. The abovementioned treatments are shown in Figure 7 above.

5.4 Future Developments

Future developments are planned to the north-east and south to south-east of the site which are of similar height to the development. Once built these developments are expected to provide significant shielding to the predominant winds to the trafficable areas within the development from the prevailing north-east and south-south-east winds. The future developments to the south to south-east are expected to shield Tower B from the south to south-easterly winds, reducing downwash flows onto the southern aspect pedestrian footpath. The future developments to the north-east of the site are expected to provide shielding to the pedestrian footpaths along Rawson Street from the direct north-easterly winds.

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APPENDIX A WIND EFFECTS GLOSSARY

A.1 Downwash and Upwash Effects

The downwash wind effect occurs when wind is deflected down the windward face of a building, causing accelerated winds at pedestrian level. This can lead to other adverse effects as corner acceleration as the wind attempts to flow around the building, as seen in Figure A.1.

This can also lead to recirculating flow in the presence of a shorter upstream building, causing local ground level winds to move back into the prevailing wind.

The upwash effect occurs near upper level edge of a building form as the wind flows over the top of the building. This has the potential to cause acceleration of winds near the leading edge, as well as potentially reattaching onto the roof area. This effect causes wind issues particularly near the leading edges of tall building and on the rooftop areas if there is sufficient depth along the wind direction. Upwash is more apparent in taller towers and podia.

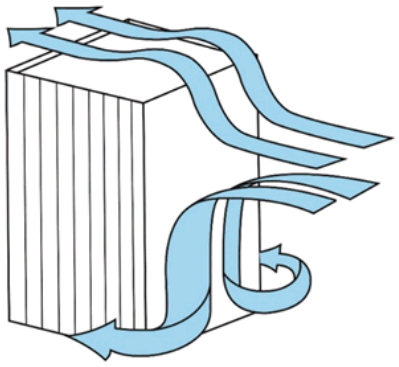

Figure A.1: Downwash Leading to Corner Wind Effect, and Upwash Effects

A.2 Funnelling/Venturi Effect

Funnelling occurs when the wind interacts with two or more buildings which are located adjacent to each other, which results in a bottleneck, as shown in Figure A.2. This causes the wind to be accelerated through the gap between the buildings, resulting in adverse wind conditions and pedestrian discomfort within the constricted space. Funnelling effects are common along pedestrian links and thoroughfares generally located between neighbouring buildings that have moderate gaps between them.

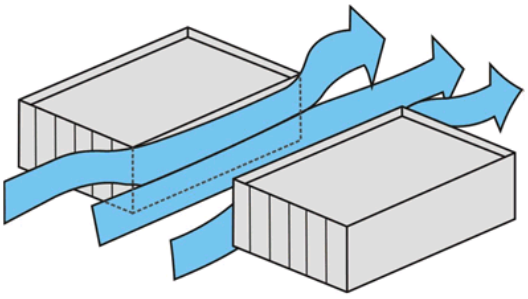

Figure A.2: Funnelling/Venturi Wind Effect

A.3 Gap Effect

The gap effect occurs in small openings in the façade that are open to wind on opposite faces, as seen in Figure A.3. This can involve a combination of funnelling and downwash effects. Presenting a small gap in the façade on the windward aspect as the easiest means through which the wind can flow through can result in wind acceleration through this gap. The pressure difference between the windward façade and the leeward façade also tends to exacerbate the wind flow through this gap.

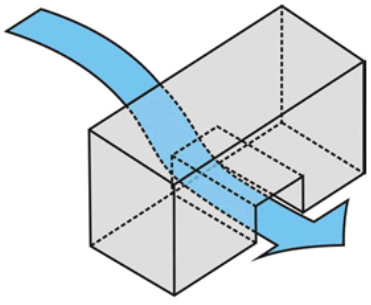

Figure A.3: Gap Wind Effect

A.4 Sidestream and Corner Effects

The sidestream effect is due to a gradual accumulation of wind shearing along the building façade that eventuates in an acceleration corner effect. The flow is parallel to the façade and can be exacerbated by downwash effects as well, or due to corner effect winds reattaching on the façade.

This is shown in Figure A.4. The corner refers to the acceleration of wind at the exterior vertical edge of a building, caused by the interaction of a large building massing with the incident wind, with the flow at the corner being accelerated due to high pressure differentials sets up between the windward façade and the orthogonal aspects. It can be further exacerbated by downwash effects that build up as the flow shears down the façade.

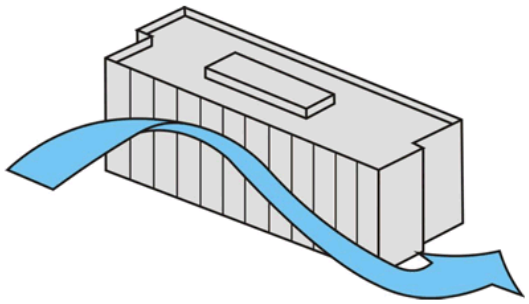

Figure A.4: Sidestream and Corner Wind Effect

A.5 Stagnation

Stagnation in a region refers to an area where the wind velocity is significantly reduced due to the effect of the flow being impeded by the bluff body. For a particular prevailing wind direction, this is typically located near the middle of the windward face of the building form or over a short distance in front of the windward face of a screen or fence. Concave building shapes tend to create an area of stagnation within the cavity, and wind speeds are generally low in these areas.

Epping Town Centre

Electrical & Hydraulic Services Infrastructure Report

30 April 2024

Ref: 301350615

PREPARED FOR:

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Revision Schedule

Revision No.	Date	Description	Prepared by	Quality Reviewer	Independent Reviewer	Project Manager Final Approval
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1. Introduction

This Engineering Infrastructure Memorandum for the Electrical & Hydraulic Services has been prepared for CANJS Pty Ltd for the development of the Epping Town Centre project located on the corner of Rawson St & Carlingford, Road Epping NSW 2121. The development consists of three residential towers (413 apartments total), three levels of commercial a retail space and up to six carpark basement levels. The proposed site locality is as per Figure 1 below.

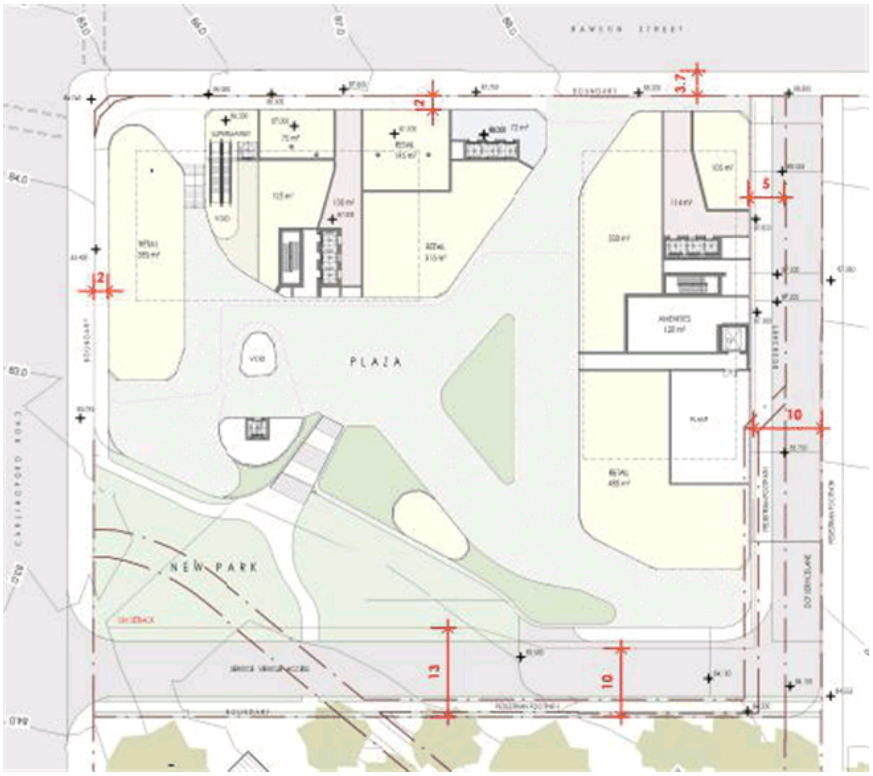


Figure 1 Site Locality Plan

Find our summary below of the electrical and hydraulic infrastructure requirements to service the above-mentioned project. The site yield matrix can be found below upon which this report has been based upon:

	PP Scheme Feb 24	Revised Scheme - 2 Tower Scheme
Land Area	9,089	9,089
Non-Residential Floor Space		
Supermarket	3,100	3,100
LG Specialty Retail	1,330	990
G Retail	2,243	2,157
Subtotal Specialty Retail		*3,147*
Commercial Office - Level 1	2,757	2,670
Commercial Office - Level 2	-	2,380
Commercial Office - Level 3	-	2,380
Subtotal Commercial Office		*7,430*
Non- Residential Floor Space		13,677
Non- Residential FSR	**1:1**	**1.5**
Residential FSR	**4.5:1**	**4.5:1**
No. apartments	420	up to 420
Total FSR	**5.5:1**	**6:1**

Figure 2 Site Yield Table

2. Executive Summary

We have summarized our findings below in regards to the adequacy of authority infrastructure that will be servicing the proposed development, overall there are no significant upgrades or changes to the authority infrastructure other than site connection adjustments to suit the final site detailing.

- Augmentation will be required to provide power to the site, It will be necessary to decommission and remove the 2 off existing substations and replace with new chamber substations (3 x 1500kVA transformers required to service the site.
- The proposed development is well serviced from existing Carrier infrastructure. No carrier diversions are required and it is not expected that there will be any carrier backhaul charges
- The authority sewer infrastructure surrounding the site is of sufficient capacity to service the proposed development. The sewer assets will be subject to alterations and deviations to allow for the construction of the development.
- The authority water infrastructure surrounding the site is of sufficient capacity to service the proposed development. Formal applications will need to be undertaken
- The authority gas infrastructure surrounding the site has sufficient capacity to service the needs of the proposed development. Formal applications will need to be undertaken

3. Electrical Services

3.1 Supply Authorities [Existing Infrastructure]

The existing site is supplied from both Ausgrid and Endeavour Energy.

Ausgrid

A kiosk type substation (S.6227) located on Carlingford Road frontage. Kiosk substation currently supplies the site (3-7 Carlingford) and also has a street feeder which also provides LV link to substation S.7061).

It is noted that if/when substation is demolished, the site would need to manage the existing street supply as part of the decommissioning works.

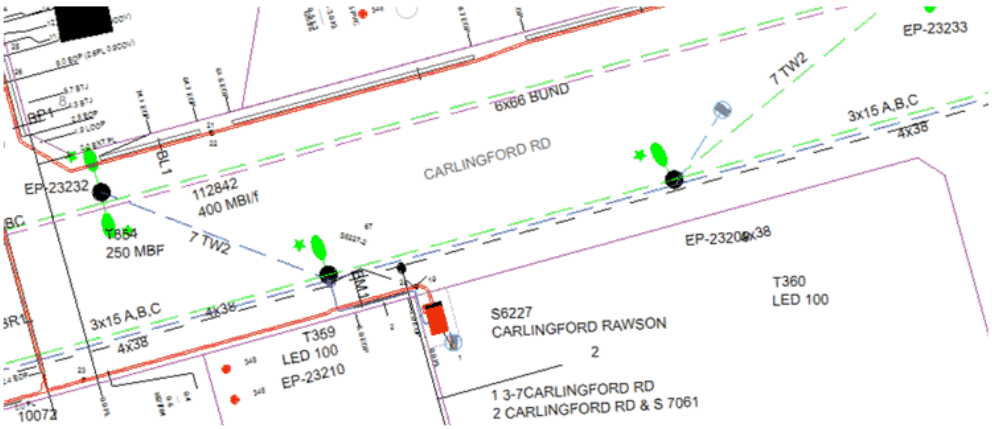


Figure 3 Ausgrid Network Asset

It is noted that there are overhead LV Ausgrid assets and overhead carrier assets (OPTUS) along the Carlingford Road street frontage. These may require undergrounding.

Figure 4 Low Voltage OH (Ausgrid)

Endeavour Energy

There is an Endeavour substation (# 6292) located on the southern portion of the site. It will be necessary to decommission and remove the existing Endeavour Energy substation.

Figure 5 Endeavour Energy Network Assets

Consideration for Temporary Builders Supply prior to decommissioning of assets. May be an opportunity to relocate or work around the kiosk sub. Alternately examine nearby substations and look for possible direct distributor.

3.2 Network Augmentation [Development]

As the proposed development is currently serviced by Ausgrid and Endeavour Energy, agreement with the authorities will be required to determine which supply authority will supply the site.

It is not known whether any Supply Authority network augmentation is required for external to the site to support the proposed development. This would only be determined once an application for connection is lodged with the Supply Authority.

3.3 Calculated Maximum Demand

The calculated maximum demand for the development is 6,472Amps [4.484MVA]. Breakdown is as depicted below.

MAXIMUM DEMAND CALCULATION **DATE** 30.04.2024
PROJECT NO EPPING TOWN CENTRE

AS/NZS 3000:2018 Wiring Rules Appendix C1

TABLE C1

Number of Apartments 420
Number of Units per Phase 140

	1	2	3	4	5	
LOAD GROUP	**DESCRIPTION**	**Single Domestic electrical installation**	**2 to 5 Units per Phase**	**6 to 20 Units per Phase**	**21 or more Units per Phase**	**LOAD (Amps)**
Ai	Lighting	3A for 1 to 20 points + 2A for each additional 20 points or part thereof	6A	5A + 0.25 per unit	0.5 per unit	70
Aii	Outdoor lighting	75% of connected Load	No assessment for purpose			0
Bi	Socket Outlets not exceeding 10A	10A for 1 to 20 points + 5A for each additional 20 points or part thereof	10A + 5A per living unit	15A +3.75A per living unit	50A + 1.9A per living unit	316
Bii	Where the electrical installation includes one or more 15A socket outlets, other than socket outlets provided in C, d, e, f, g and I	10A				10
Biii	Where the electrical installation includes one or more 20A socket outlets, other than socket outlets provided in C, d, e, f, g and I	15A				15
C	Ranges, cooking appliances, Laundry equipment or socket outlet rated more than 10A for the connection thereof	50% of connected load	15A	2.8A per living Unit		392
D	Fixed space heating or air conditioning equipment, saunas or socket outlets rated at more than 10%	75% of connected load				1050
E	Instantaneous water heaters	33.3% of connected load	6A per living Unit		100A + 0.8A per unit	212
F	Storage water heaters	33.3% of connected load	6A per living Unit		100A + 0.8A per unit	
G	Swimming Pools. Spas	75% of largest spa, plus 75% of largest swimming pool, plus 25% of remainder				40
Loading not associated with individual units - connected to each phase (communal lighting, laundry, lifts, motors etc)						
H	Communal Lighting	N/A	Full connected load			60
I	Socket outlets not included in groups J and M below. Permanently connected electrical equipment not exceeding 10A	N/A	2A per point, up to maximum of 15A			0
Ji	Appliances rated at more than 10A : Clothes dryers, water heaters, self heating washing machines	N/A	50% of connected load			0
Jii	Appliances rated at more than 10A : Fixed space heating, air conditioners	N/A	50% of connected load			0
Jiii	Appliances rated at more than 10A : Spa and swimming pool heaters	N/A	75% of largest spa plus 75% of largest swimming pool, plus 25% of remainder			0
Jiv	Electrical Vehicles Charging Equipment	Full Connected Load	100% Connected Load	90% Connected Load	75% Connected Load	1000
K	Lifts	Largest lift motor : 125%, nest largest lift : 75%, Remaining lift motors : 50%				400
L	Motors	Largest motor : 125%, next motor : 75%, Remaining motors : 50%				0
M	Appliances, including socket outlets other than those set out in groups A to L above	Connected load 10A or less : no assessment ; Connected load over 10A : By assessment	Connected load 10A or less : no assessment ; Connected load over 10A : By assessment			0
OTHER						
Supermarket		3,265m2 Supermarket				800
Commercial		7430m2 @90VA/m2				964
Retail		2,578m2 @ 250VA/m2				931
Mall		522m2 @ 60VA/m2				45
Basement		23,224m2 @ 5VA/m2				167
TOTAL						
					TOTAL LOAD IN AMPS	**6472**

	kW	4484
assume PF = 0.9	KVA	4982
site diversity 85%	KVA	**4235**

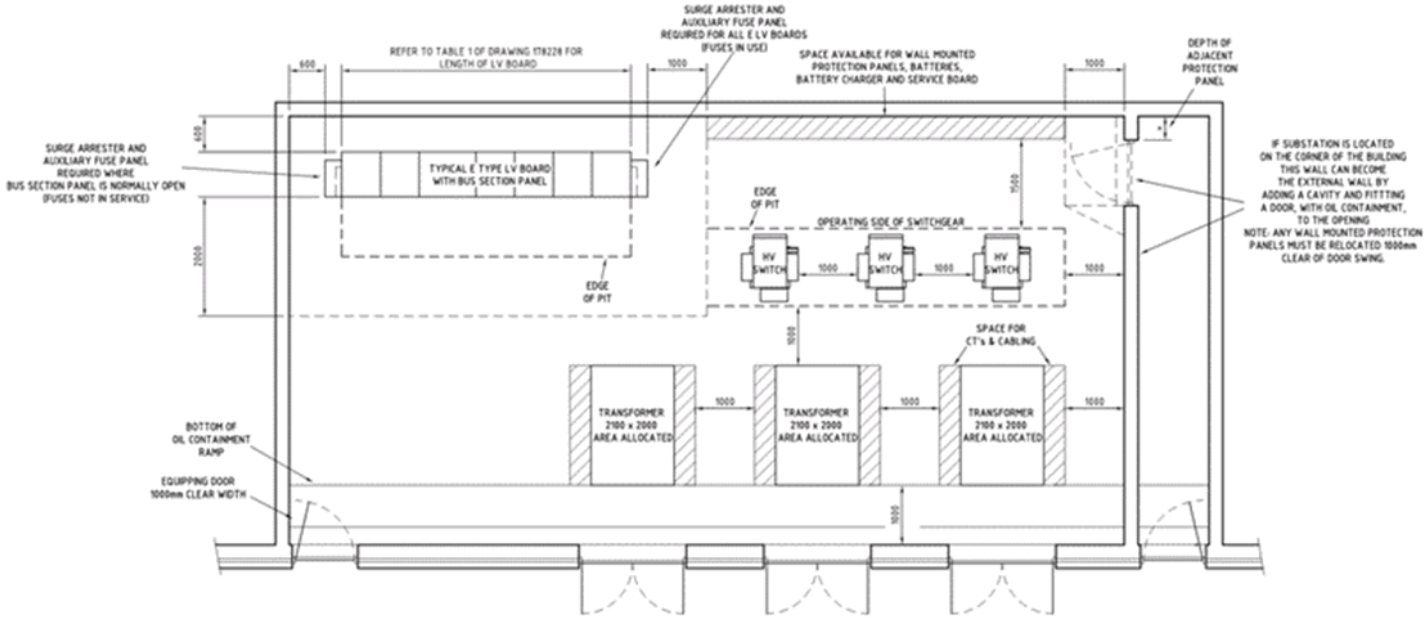
3.4 New Site Substation Requirements

The existing site substations [Ausgrid : S.6227 and Endeavour Energy : 6292] will be decommissioned and removed.

Required Substation options [per Supply Authority] are provided below.

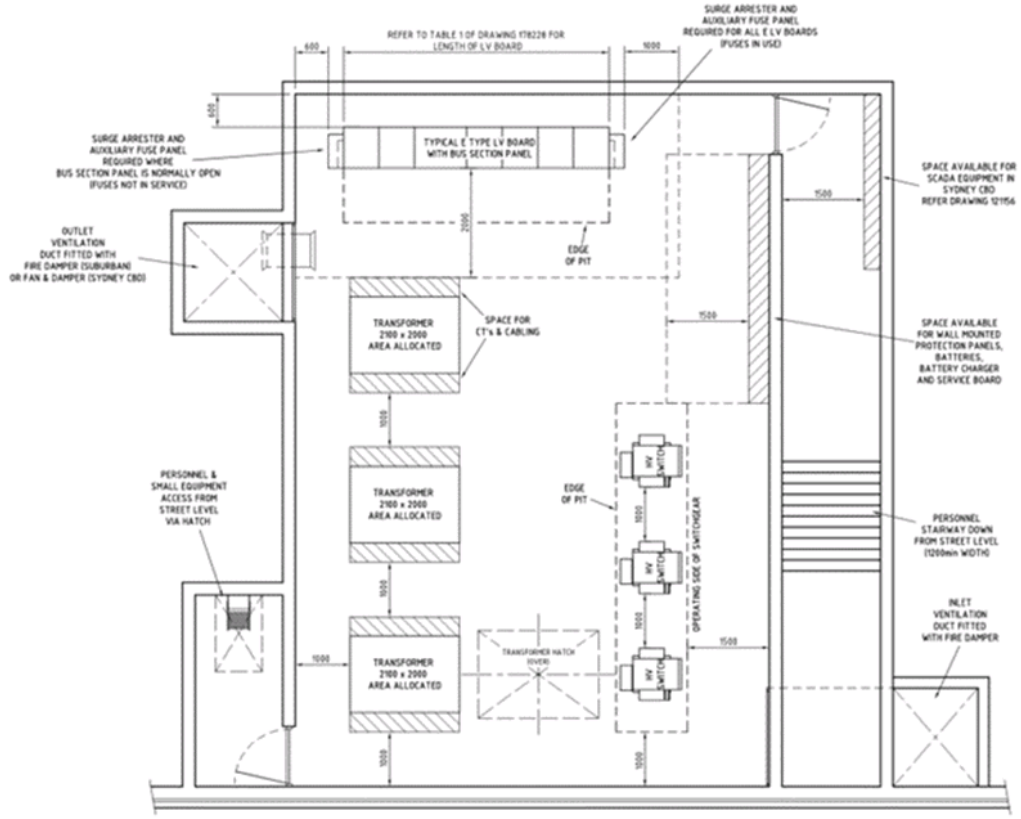
3.4.1 Ausgrid

Option 1: 3 x 1500kVA Surface Chamber



SURFACE CHAMBER SUBSTATIONS
REFER NOTE 4

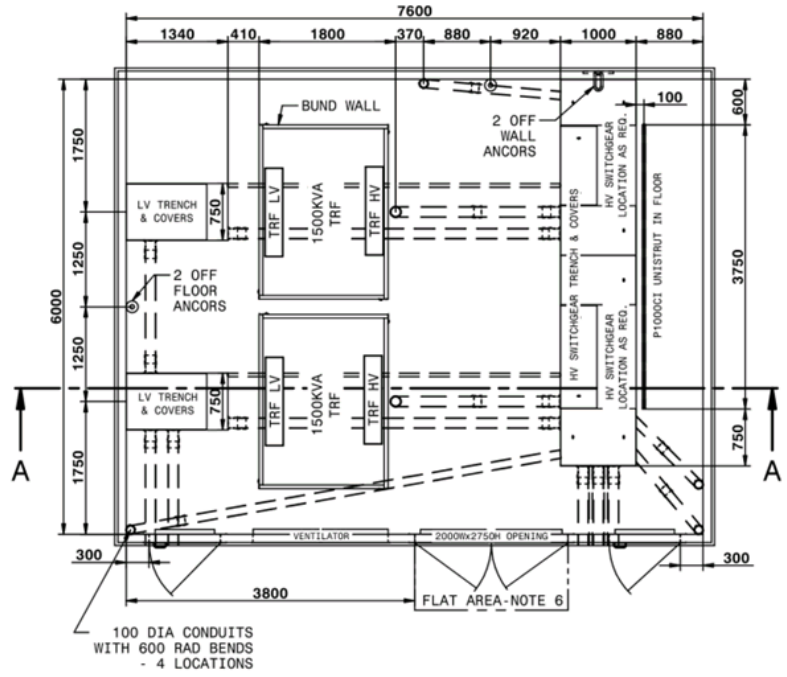
Option 2: 3 x 1,500kVA Basement Chamber

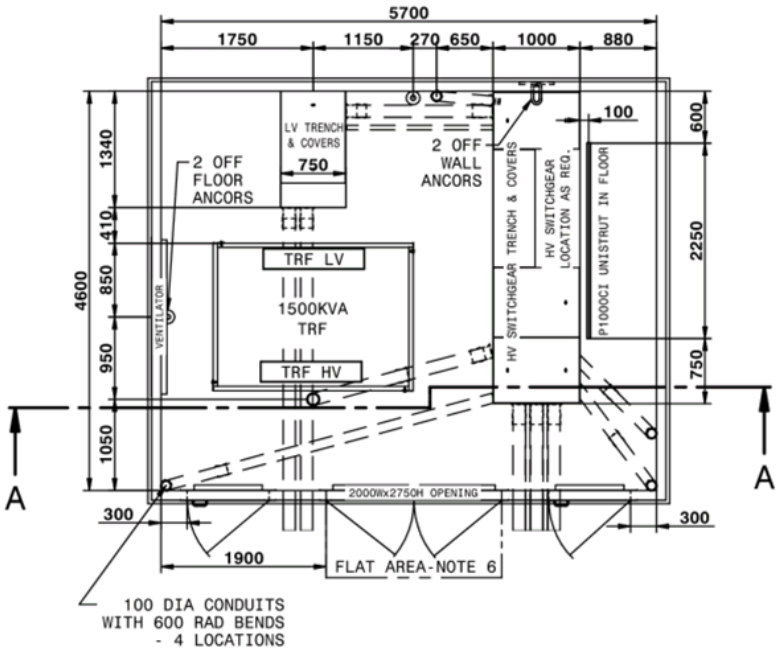


BASEMENT CHAMBER SUBSTATIONS
REFER NOTE 4

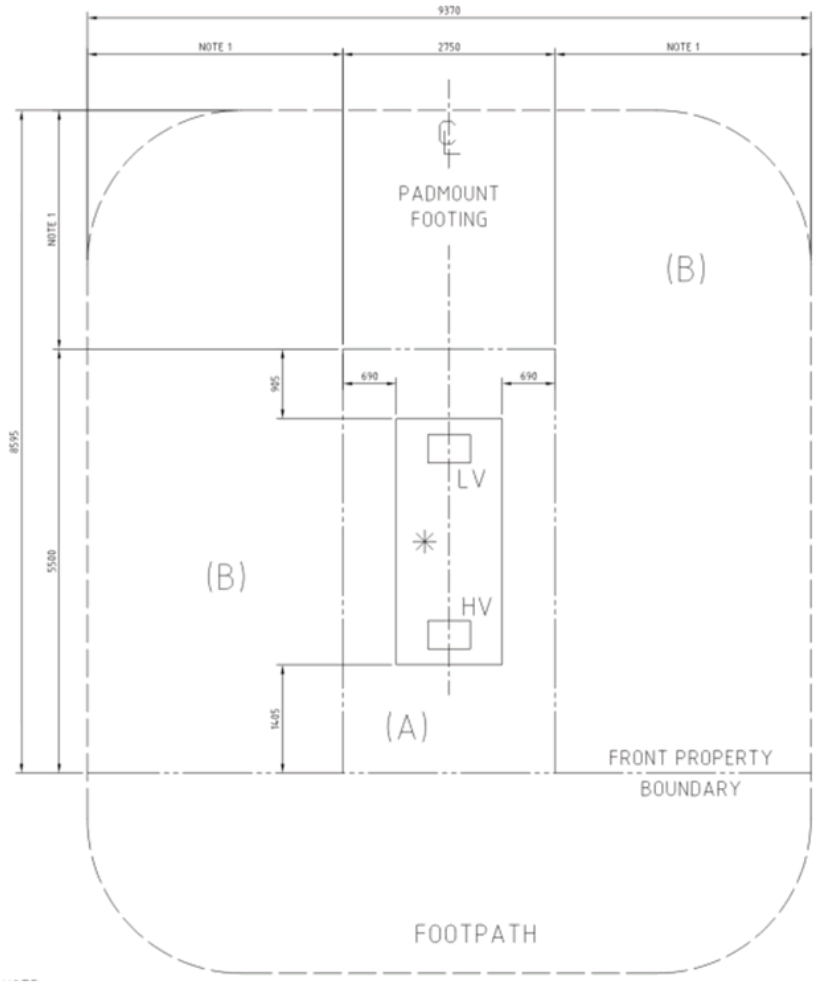
3.4.2 Endeavour Energy

Option 1: 1 off 2 x 1,500kVA Chamber Substation and 1 off 1 x 1500kVA Chamber Substation [total of 3 x 1500kVA Transformers]





Option 2: 3 x 1,500kVA Kiosk Type Substations [Easement of 5,500mm x 2750mm per each]



3.5 Communication Lead-in

3.5.1 GENERAL

Existing Carrier infrastructure is depicted below. The site is well serviced by existing Carrier networks, including NBN. No Carrier relocations are required.

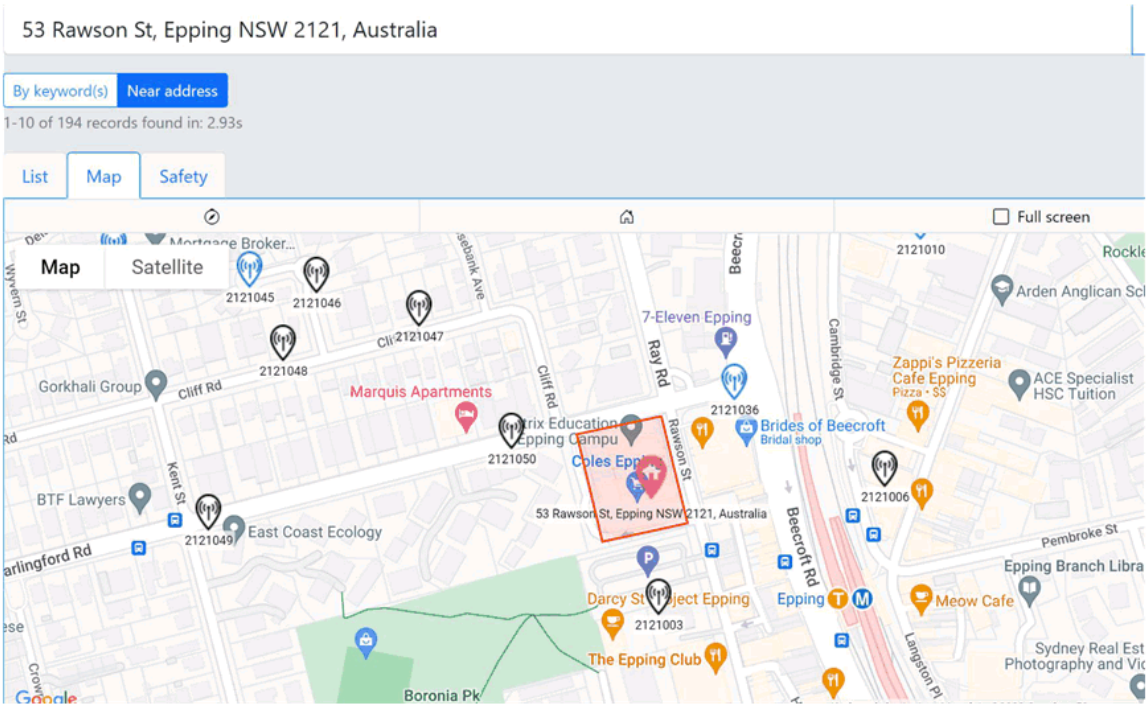
New Carrier lead-ins would be required for the site. It is proposed to allow sufficient lead-in conduit to service at least 2 carriers.

The area is NBN ready. An application for carrier services would need to be made with the NBN Co.

Owing to the existing carrier network infrastructure available, it is not expected that any backhaul charges will be charged.

3.5.2 Carrier Mobile Base Stations

It is noted that there are no carrier mobile base stations located on the site that will require relocation as per information available from Radio Frequency National Site Archive website search.



3.5.3 NBN

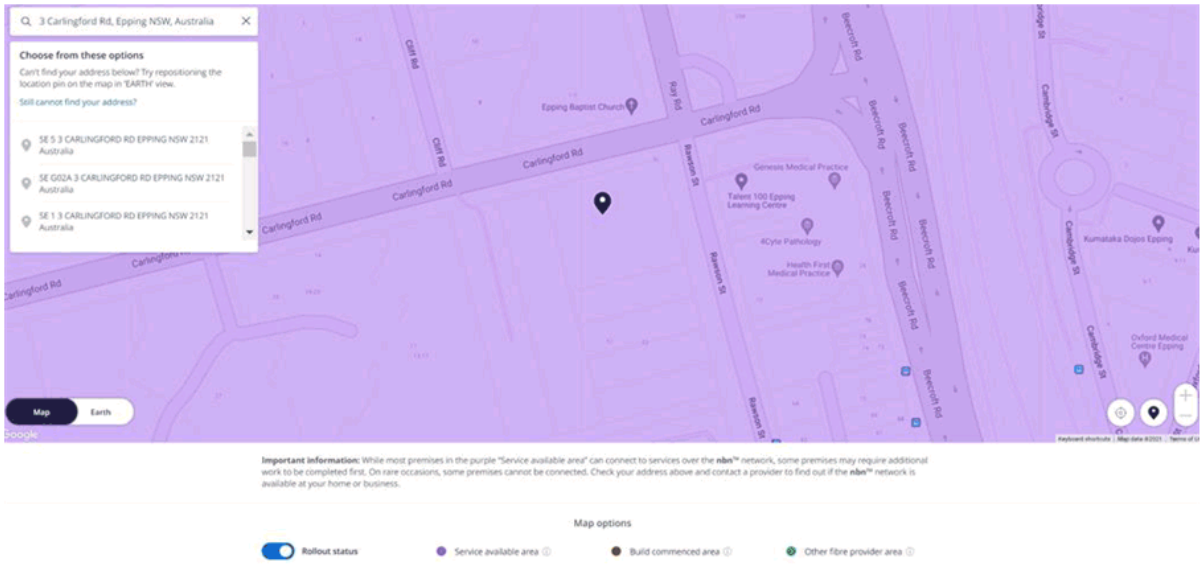
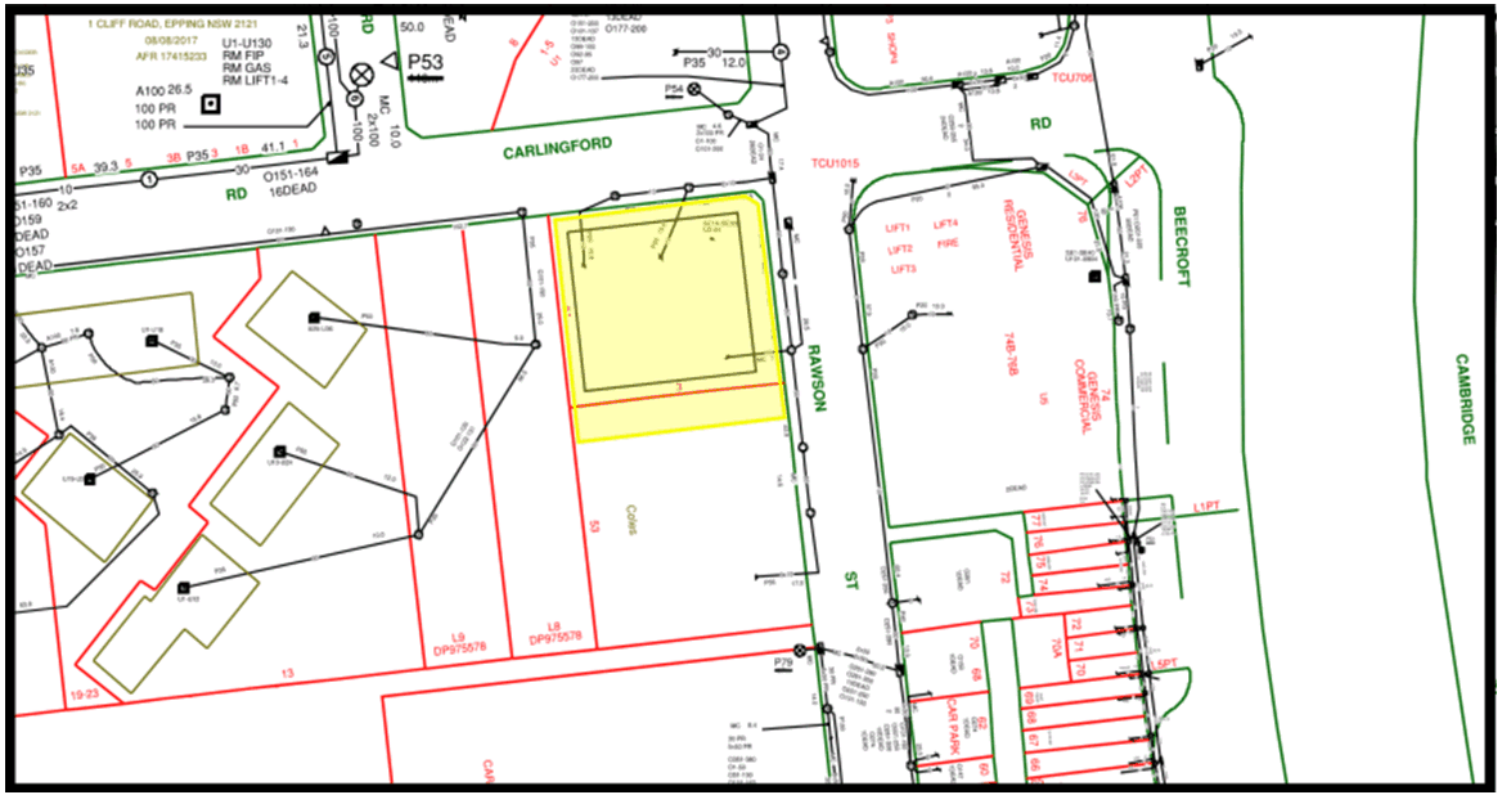


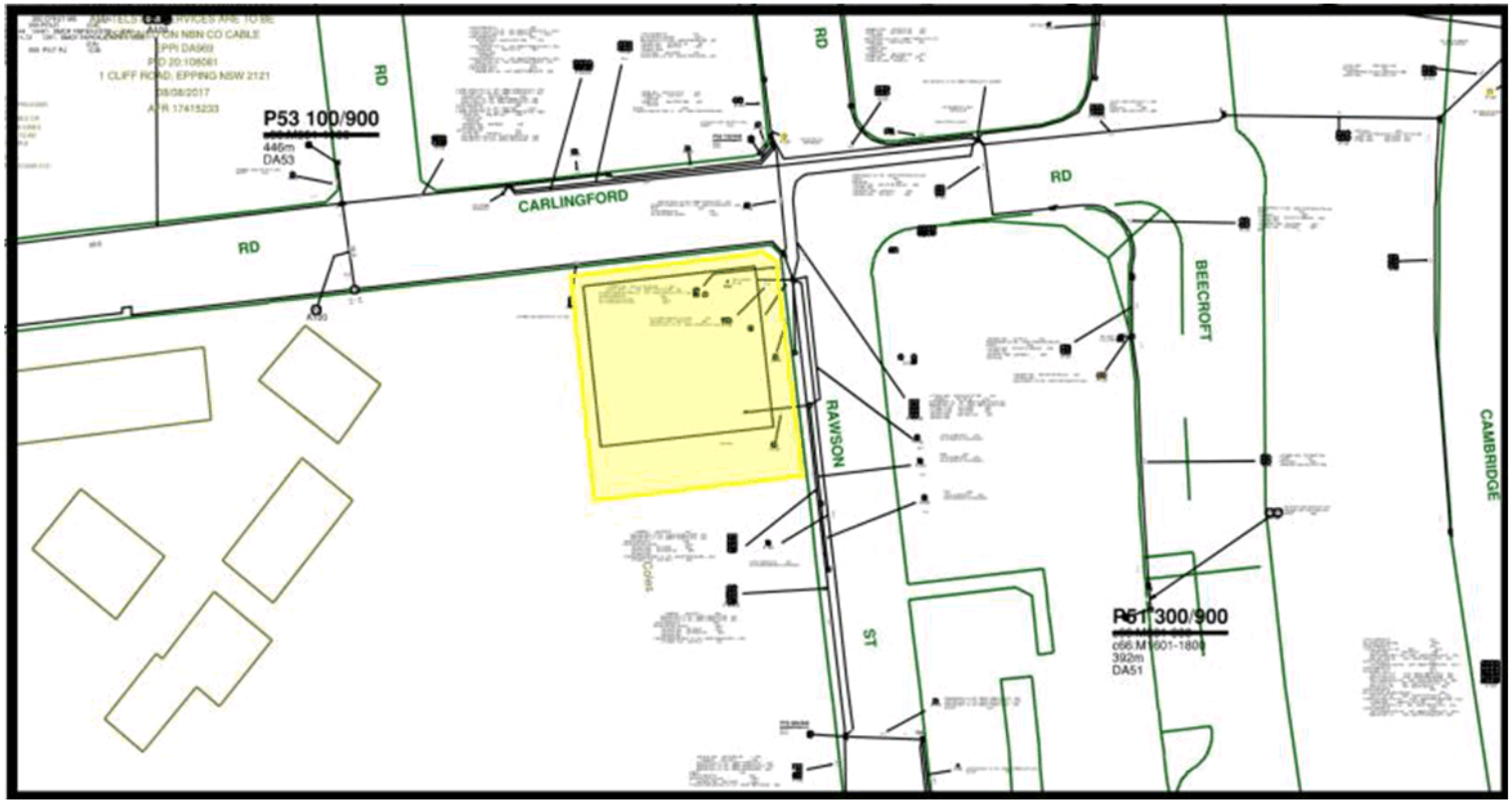
Figure 6 NBN Rollout Map

3.5.4 Telstra

Cable Plan



Mains Cable Plan



3.5.5 Optus

CLIFF RD
CARLINGFORD RD
CARLINGFORD RD
FORD RD
BEECROFT RD
CAMBRIDGE ST
LANGSTON PL
RAWSON ST
RAWSON ST
VICTORIA ST
PEMBROKE ST
PEMBROKE ST
PEMBROKE ST
BLAXLAND
1
2

4. Hydraulic Services

4.1 Sanitary Drainage (Sewer)

4.1.1 Sewer Investigations

- Based on our initial investigations, connection to the 225mm diameter sanitary sewer main infrastructure surrounding our site are deemed to have sufficient capacity to service the demands of the project as noted below. Engagement of a Water Servicing Co-ordinator (WSC) will be required during the detailed design phase of the project to design the required alterations & deviations to the affected assets traversing through our site to allow for construction works. Refer to Sydney Water hydra map below for affected assets:

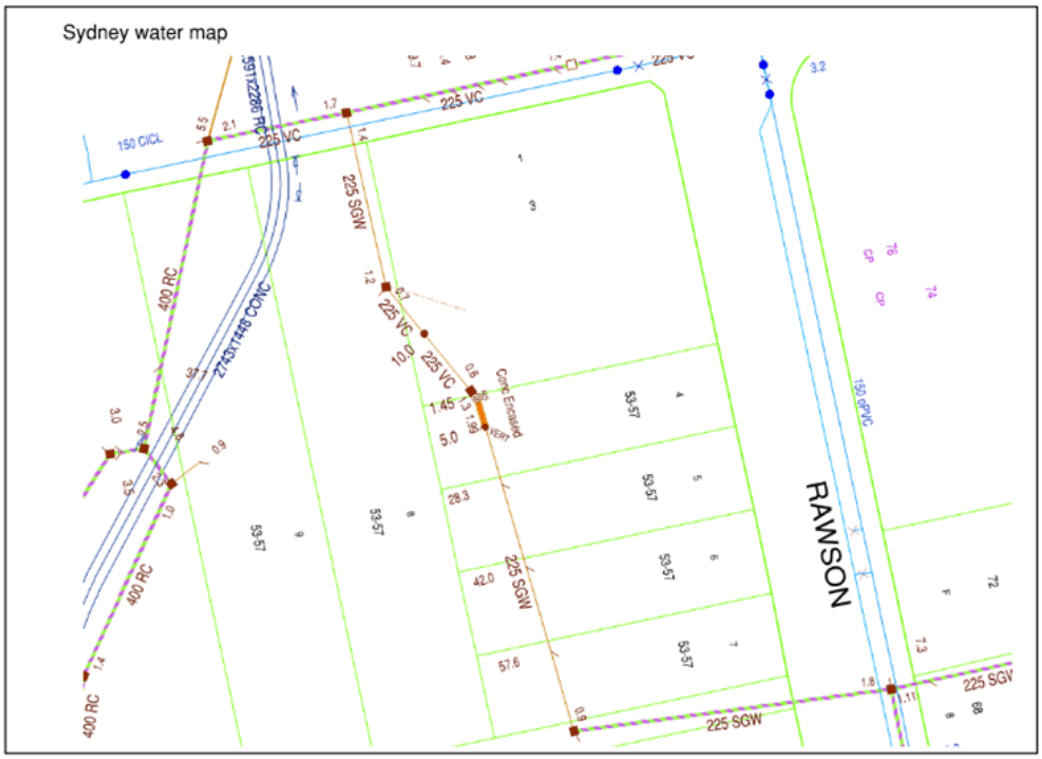


Figure 7 Sydney Water DBYD

4.1.2 Existing Sewer Assets

- As illustrated, the DBYD Information indicated that there is an existing sewer main running through the site.
- This sewer will likely need to be modified to enable the excavation of the basement car park levels. The proposed modifications are indicated on the following spatial layouts and we strongly recommend that a Sydney Water Coordinator is engaged and a section 73 preliminary investigation is conducted.

4.1.3 Proposed development load

- There is a 225mm VC & 400mm RC Sydney Water sewer mains traversing through the proposed property. These services will need to be re-routed to allow for building excavation and service the property with a connection.
- The sanitary sewer demand for the site is approximately 14,200 sanitary fixture units. 3 x 225mm gravity connections on the north and southern portions of the site to the Authorities main sewer infrastructure running through the site depending on final invert levels after the sewer deviation works.

TABLE 3.3.1

MAXIMUM FIXTURE UNIT LOADING FOR VENTED DRAINS

Grade %	Nominal size of drain DN						
	65 (see Note 1)	80	100	125	150	225	300
5.00	60	215	515	1450	2920	11 900	26 900
3.35	36	140	345	1040	2200	9490	21 800
2.50	25	100	255	815	1790	8060	18 700
2.00	×	76	205	665	1510	7090	16 600
1.65	×	61	165	560	1310	6370	15 000
1.45	×	(50)	(140)	485	1160	5810	13 900
1.25	×	(42)	(120)	425	1040	5360	12 900
1.10	×	×	×	(380)	935	4970	12 100
1.00	×	×	×	(340)	855	4500	11 400
0.85	×	×	×	×	(725)	3850	10 300
0.65	×	×	×	×	(595)	3250	9090
0.50	×	×	×	×	×	×	7720
0.40	×	×	×	×	×	×	6780

Figure 8 Fixture Unit Loading Table

4.1.4 Sewer Servicing recommendation/ Conclusion

- The authority sewer main infrastructure surrounding the site has sufficient capacity to service the needs of the proposed development.

4.2 Potable Water & Fire Fighting

4.2.1 Potable Water & Fire Fighting Investigation

- Based on our initial investigations, connection to the 150mm diameter water main infrastructure in Carlingford Road or Rawson Street are deemed to have sufficient capacity to service the demands of the project as noted below. Sydney Water pressure and flow readings information will be required during the detailed design phase of the project to determine water storage requirements for the project. We confirm the potable water simultaneous demand to be in the range of 20-22 L/s. The fire water load is to be approximately 55 L/s (3 hydrants flowing in carpark and ordinary hazard group 3 (OH3) sprinklers to retail areas) allowing for simultaneous hydrant and sprinkler operation.

4.2.2 Domestic Cold-Water load

- A 150mm connection to the Authorities water main infrastructure running along Rawson St and Carlingford Rd complete with main isolation valve and water master meter
- On-site tank storage complete with filtration and pumping equipment

4.2.3 Fire Services load

- A 150mm connection to the Authorities water main along Rawson St and Carlingford Rd complete with main isolation valve and water master meter

- Provision for a 150mm brigade booster set in cabinet 3600L x 1800H x 800D (clear internal dimensions)
- Conduct testing of the Authorities water main infrastructure to determine flow and pressure characteristics for fire fighting purposes
- Provision for on-site pumps and tanks (subject to receipt of the pressure and flow enquiry)

4.2.4 Potable Water & Fire Fighting water recommendation/ Conclusion

- The authority water infrastructure surrounding the site has sufficient capacity to service the needs of the proposed development. The on-site water storage infrastructure requirement will be further determined in the detailed design phase of the project.

4.3 Gas

Based on our initial investigations, connection to the 32mm @ 210kPa gas main infrastructure in Carlingford Road or Rawson Street are deemed to have sufficient capacity to service the demands of the project as noted below. A Jemena gas network tap-in application will be required during the detailed design phase of the project to determine the final adequacy for the project. There is an existing gas main sideline traversing the site that will need to be demolished and capped off to facilitate the building footprint and excavation process. Refer to Jemena gas network map below for affected asset.

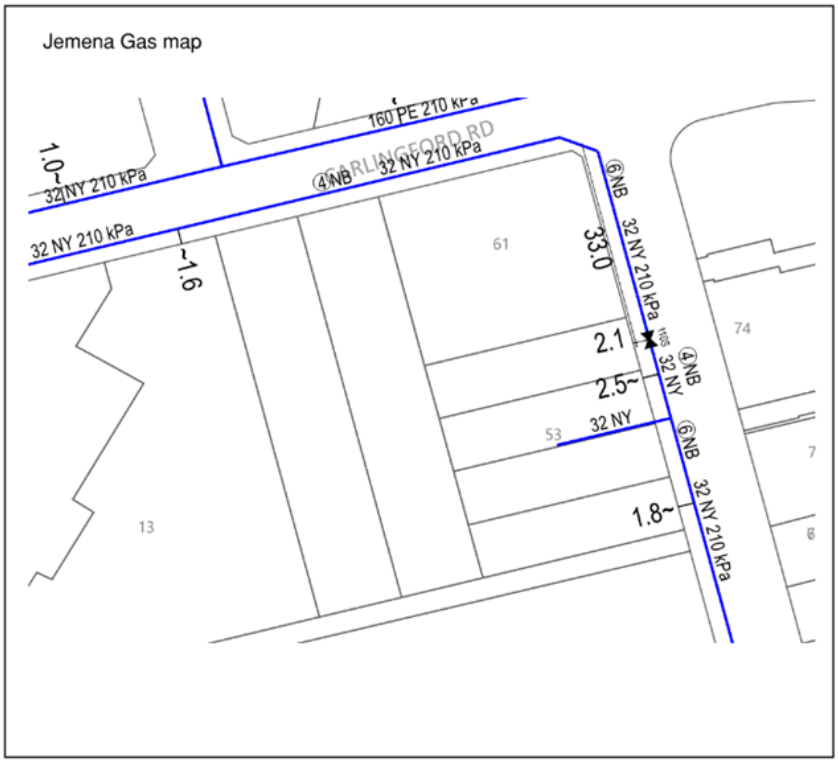


Figure 9 Jemena Gas Network Map

4.3.1 Existing Gas Infrastructure

- As illustrated in Figure 9 the DBYD information indicates that there is an existing medium pressure main extending along Carlingford Road and Rawson Street.
- The proposed connection point is to be connected to the Carlingford Road frontage, a connection application will need to be sought to confirm final connection location and details.

4.3.2 Gas Load

- Gas Services incorporating:
  - The gas demand for the site comprises of the following items:

    Residential Cooktops (Diversified) – 4,000 MJ/Hour

    Hot Water Plant (Full Load) – 3,500 MJ/Hour

Retail (Full Load) – 3,500 MJ/Hour

Total Gas Demand = 11,000 MJ/Hour

- A **32mm** connection at 210 kPa available to the Authorities gas main infrastructure located **along Rawson Street** complete with main isolation valve and 1# gas master meters each for Commercial and Residential.
- Retail boundary regulator for retail stratum and each retail tenancy to apply for own sub-meters.

4.3.3 Gas recommendation/ Conclusion

- The authority gas infrastructure surrounding the site has sufficient capacity to service the needs of the proposed development. A Jemena gas connection tap-in application will be required during the design development phase of the project to determine final adequacy. The gas assets will be subject to alterations to allow for the construction of the development, this will be a part of the Jemena application noted above.

5. Conclusion

- In conclusion, based on our investigations and findings we can confirm that the surrounding authority infrastructure will be of adequate capacity to service this development.

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